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The dispute, which has been going on for over a year, is clouded in secrecy, with IBM refusing to even speak with reporters here and government officials mum on the sub-

IBM's worldwide invoices list both the manufacturing cost of a system and the selling price. IBM charges "legitimate" expenses against the difference — which is large — in

Most other companies here invoice differently, putting such expenses in the base price of the system and not having quite as large a gap between the base and selling prices. IBM, however, has refused to change

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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"If all of the add-on facilities in
(Continued on Page 6)

In addition, the software support feature allows System/34s to communi-

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Considered by privacy experts to be an extension of an individual's record, the disclosure of files containing personal data has rarely been automated by federal agencies. Braithwaite said he knows of only one agency which

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Not Part of Agency Scandal CSC Overbilling Noncriminal: GSA

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Contrary to several recently published newspaper reports of a "falsification scheme" by the Infonet Division of Computer Sciences Corp. (CSC) of Los Angeles that resulted in contract overpayments by the General Services Administration (GSA), a final audit report issued last week by GSA indicated there is "no basis for any criminal investigation" in the matter.

The finding comes in the face of a mushrooming scandal surrounding the GSA that purportedly involved losses of \$70 million in kickbacks, phony charges and outright theft.

Although GSA Administrator Jay Solomon has estimated that 50 indictments can be expected in the next few weeks in connection with the overall investigation, CSC will not be the target of any of them.

Although it is "very clear" that the government has been overcharged by CSC, in an amount "under \$300,000," it isn't possible to say whether the overcharge was the result of "sloppy management" by CSC and its subcontractors or whether it was a deliberate misrepresentation, according to Frank

Carr, commissioner of ADP and telecommunications for GSA.

The GSA investigation found that the overpayments went to computer consultants whose qualifications have been found to be less than those required by the government contract for a particular skill category and corresponding labor rate, Carr said.

Original Complaint

The investigation arose out of a complaint filed in 1976 with the General Accounting Office (GAO) by a former employee of CSC. In June 1976, GAO contacted GSA's auditing office to start the investigation.

The original complaint charged that "some federal agencies [were] being provided with consulting services, systems analysts and programmers by subcontractors under the Infonet prime contract, circumventing the procurement regulations that require competition," according to Carr.

The complaint also said "the selection of the firms to provide such services to the agencies was being made by CSC salesmen, often ignoring the recommendations of a data base management expert as to the best qualified or least costly firms."

Further, it asserted that "there appear[ed] to be collusion between the salesmen and the firms in overcharging CSC for the services, the costs of which [were] later charged to the government."

In addition, "the invoices submitted to CSC contain[ed] overcharges, improper cost allocations and insufficient detail," according to the allegations.

According to Carr, the investigation found the first allegation was true, but "the agencies claim they were not aware they they were required to act differently under this program."

The GSA audit found no supporting data for the second and third charges.

The only allegation found to be true was that concerning inaccurate and incomplete invoices "with those charges passed on to government," according to Carr. The subcontractors involved were Icarus and Psytran in the Washington, D.C., area and the CSC Systems Division, according to Carr.

According to Carr, GSA plans to take action "to recover the excess charges made to us." The GSA contract officer will go through the qualifications/salary list with CSC, and "if [the auditors] can show us errors we've made, then we can make adjustments."

Corrections

Data General Corp. has agreed in principle to purchase 50% of Nippon Minicomputer Corp. of Japan, not Nippon Electric Co. [CW, Sept. 11].

In "Datapoint 1800 Handles Cobol, Runs With ARC" [CW, Aug. 28], the 1800 should have been described as a "slowed-down 5500" not a slowed-down 1500. The 1800 processor is actually a new unit, but it handles all the instructions available on the 5500, a Datapoint spokesman explained.

CDC Doubles 3350 Disk

(Continued from Page 1)

\$63,000, respectively; a comparable amount of IBM 3350 storage is priced at approximately \$129,000 and \$160,000.

Monthly lease prices for the units on a one-year contract are \$1,800 for the A2, \$2,185 for the A2F, \$1,520 for the B2 and \$1,905 for the B2F.

In a related development, CDC an-

nounced that purchase and lease prices of selected disk pack and disk cartridge products have been raised an average of approximately 5%. The move was necessitated by the rising costs of materials and labor involved in the production of the media, company officials stated.

CDC can be reached at Box 0, Minneapolis, Minn. 55440.

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Irani Government Termed 'Computer Junkyard'

By E. Drake Lundell Jr.
CW Staff

TEHRAN, Iran — The Irani government's utilization of computers is a "mess," according to some observers here, while others will only say the government is a "computer junkyard."

In assessing the blame for the situation, there is plenty to go around. The guilty ones range from government ministers who, lacking staffs sophisticated in computing, bought superlarge systems for their prestige value to U.S. mainframe makers, lured here for quick and high profits, who oversold their wares to novices.

The situation is so bad that the Shah appointed an Imperial Commission to study the matter. The commissioners have reviewed 150 different installations over the past 18 months. A report written for the Shah is at present heavily guarded, but is expected to be released late this year or early next, recommending strong action to overcome the problems.

Utilization figures for equipment within the government probably ranges on an individual agency basis between zero and 40%, according to one knowledgeable source. While it may be hard to imagine a zero utilization factor, one agency — the Ministry of Education — has had a system in crates on its premises for almost a year now, several sources noted.

Another oft-criticized agency is the

Ministry of Agriculture, which is able to keep its two Univac 1110 computers occupied only about 5% of the time, the sources said. The Ministry of Finance was characterized as a "complete mess" by at least three sources here.

Prestige Purchases

The situation at the Ministry of Agriculture illustrates the problem of purchasing systems on the basis of prestige, the sources agreed. When the Shah ordered government agencies to begin to computerize five years ago, it set off a race among government users to see which could have the largest hardware configuration in Iran, a race that was eventually won by Agriculture.

However, the Agriculture Ministry did not leave enough money in its automation budget to develop the necessary programs to make the hardware operate efficiently. The system sits idle most of the time.

Most government ministers, the sources noted, have had little experience with computers and do not appreciate the large amount of effort that must go into developing the programs and procedures for a large operation. "The attitude seems to be that you can just plug it in and the computer will begin producing all the information you need," one source said.

In addition, not very much data is available to use on the planned systems, and the work needed to collect

DP Journal Bows Today

TEHRAN, Iran — A journal for the computer, electronics and business equipment community in Iran and the Middle East will be published here beginning Sept. 13.

Mideast Computer will fill a communications vacuum in what is estimated to be a \$500 million market in Iran alone. Last year computer placements in Iran increased by nearly 100% over 1976, according to government sources.

"This upward trend is really going to gain momentum in the early 1980s," according to Taraneh Tahbaz, magazine board chairman.

The objective of the magazine will be primarily to inform the computer, electronics and business equipment community of the latest developments in Iran and the Middle East, she said. It will also en-

courage the use of advanced technological equipment by both private and government sectors and support current moves to establish a computer society in Iran.

"We will try to answer a lot of questions that to date have remained unanswered," Tahbaz said. "For example, we will tell our readers the real reasons why IBM stopped leasing equipment in Iran since 1977. We will report why the Saudi Interior Ministry is planning to sign a \$225 million contract with Computer Sciences Corp."

The magazine, which will be supported editorially by *Computerworld*, will initially be published in tabloid size on a monthly basis. It will become a bimonthly and eventually a weekly, Tahbaz said.

IBM Not Selling or Leasing in Iran Now

(Continued from Page 1)

the way it invoices to meet the particular situation here.

Ex-IBMers Blew Whistle

On the other matter, IBM has been importing lease equipment from Paris on temporary licenses. These licenses are renewed regularly, avoiding the Irani taxman completely.

The situation came to light several years ago when many IBM employees left to join Information Systems Iran (Isiran), a private company that was taken over by the government three years ago. The ex-IBMers reportedly told of the IBM accounting practices and the "temporary" license scheme.

The mere existence of Isiran — a private firm set up to import Honeywell, Inc. equipment — is an irritant to IBM and its efforts here, and some sources said it might be part of the reason IBM pulled out of the market.

Isiran was formed by Prince A. Mahvi, a man with close connections to the royal family. Isiran initially supplied Honeywell equipment to the Irani military after Shah Reza Pahlavi decided to standardize on the Honeywell 6000 for the armed forces.

In addition to Mahvi's involvement, Isiran was backed by the Pahlavi Foundation, a charitable trust set up by the Shah's family. Both of these involvements led many observers to charge nepotism.

Situation Aggravated

The situation was aggravated last year when a directive was sent to all government agencies suggesting they consider Honeywell equipment in future purchases — a move which could have effectively barred IBM from its

most lucrative market since the government buys most of the medium- and large-scale systems in this country.

While that directive was only a suggestion, several agencies took it as an order and began considering Honeywell to the detriment of IBM, reportedly infuriating the IBMers on the scene.

The directive was later rescinded, mainly because Isiran has a hard enough time supplying not only hardware, but also software and consulting services to the military. The bad blood remained, however.

The threat of Isiran and Honeywell was probably more apparent than real to the IBMers since Isiran today only derives about 10% of its revenues from hardware sales, observers have pointed out. However, the "arrogant" attitude of IBM certainly did not help the situation in the eyes of the Iranians, the observers said, adding IBM now seems to be almost going out of its way to be antagonistic.

IBM refuses to negotiate any computer contracts here, referring people in need of upgrades to its Paris office, where they receive very low priority. In addition, while IBM in Paris will now discuss delivery of Series 30 processors to Irani government agencies, it refused to do so for the first year after the 3033 announcement.

In one case a government agency has practically been "begging" IBM for an upgrade, only to be met with a very supercilious attitude, sources said, leading to more bad blood between the two groups.

Another factor in the situation is the feeling on the part of many Iranians sophisticated in computer use that

the data before the computers were installed was never done.

In one example, even the well-run and relatively prestigious firm Information Systems Iran (Isiran) reportedly developed a very sophisticated personnel records system for the armed forces before realizing there was a huge lack of source data for such a system.

As a result, a team of 400 personnel

had to be assigned to collect the data needed by the system in order for it to work effectively.

Catered to Prestige

This lack of sophistication and analysis of the problems that users need solved has led to overselling by the computer mainframers here, Iranians have angrily charged.

Instead of trying to help the user identify his true needs and what applications can be implemented quickly and efficiently, these manufacturers have often catered to the prestige factor and talked ministers into buying systems much larger than what they really needed, they said.

In another area, the Iranians have had to rely to a large degree on "foreign" or "expatriate" workers — largely English and American — for aid in developing systems and applications because such expertise was not available on a large enough scale in Iran.

These "expats," as they are called, often produced systems or programs that did not meet Iran's particular needs, one government source said. "The programs might have worked fine in England or the U.S.," the source added, "but they were complete disasters here."

Environmental Factor

Another factor complicating the whole situation is the environmental one. Electrical power is not as reliable as in the U.S. and may be erratic coming into installations, causing crashes and system failures.

Tehran, where most of the civilian and government computers are located, is a dusty city.

Communications links are dismal at best, making data transmissions a risky business. About 2,400 bit/sec is the highest speed most users will try and even then they experience high error rates on the lines.

Another problem involves the pay levels for government DP personnel.

The rates are tied in with those of other white collar workers in the government, although trained computer personnel can command far higher salaries in the commercial marketplace — three times their government salaries, according to one source.

Intransigence Paying Off?

IBM's refusal to deal with the Iranians, however, now seems to be paying dividends to IBM.

In one operation here, a 370/158 multiprocessor configuration has reportedly experienced severe thrashing problems operating under MVS — largely because it needs a memory upgrade. Currently at 4M bytes, the Iranians ordered an additional 2M bytes a year ago but have not been able to get delivery because of the IBM attitude, informed sources said.

Because of this, the government agencies involved with IBM probably have been pressuring the tax bureau to come up with a solution to the IBM tax bill acceptable to IBM so they can begin getting needed equipment again.

The massive Irani bureaucracy may be brought to its knees by IBM's intransigence on this matter, and IBM is expected to be back in operation here — on its terms — within a month.

DP Center in Middle of Civil War For Beirut DPers, Gunfire Only One Problem

By E. Drake Lundell Jr.
CW Staff

BEIRUT, Lebanon — You think you've got problems? They're probably nothing like the ones Col. Joseph Wehbe faced as he tried to process a payroll during the 12 months in 1975 and 1976 his DP center here was under siege.

As the civil war between the Christian and Moslem factions raged in this city, leaving many buildings deserted shells, Wehbe and a small group of civilians managed to keep their 256K IBM 370/135 up and operating — and never missed delivering the payroll checks, which went to people on both sides of the conflicts.

But it wasn't easy, although Wehbe, an urbane and intelligent man, makes it sound like an everyday occurrence when he talks about it now.

The center is nominally run by the army, but it processed all the government payrolls during the conflicts. It is situated almost at the dividing line between the east and west sections of the city — with each area under the control of a different faction.

At various times, each side attacked the center not only with rifle and machine gun fire, but also with long-distance artillery that ringed the city and fired at specific targets from its mountain redoubts.

At some times, the center was attacked by forces which believed it contained arms, since it was an army center; at other times, it was attacked by forces which thought the center had been taken over by its enemies.

Even though it was nominally an army installation, the DP center was unprotected by troops, Wehbe recalled. Most of the staff were either civilians or technical people from the army who "didn't know anything about combat."

Three Left Standing

The thing that probably saved the computer from destruction was the way the center was constructed, Wehbe said. It was only one of three centers left out of the original 22 that existed when the fighting began.

The center was built with the computer room in the middle, surrounded by offices. Although the offices were continuously hit with machine gun and artillery fire, the attacks did not penetrate the computer room itself.

When most major efforts were launched against the center, Wehbe was able to convince the attackers that the center had no arms. Several times, however, attackers had to be physically fought off by the programmers and analysts, who made up the bulk of the staff.

One of the major problems constantly faced at the center was maintaining a sufficient supply of fuel oil since it had to operate much of the time on its own diesel electric generator. Several times the fuel supply ran dangerously low.

In those cases, Wehbe would send out scouting parties to find someplace that still had fuel available — taking whatever and how much they could get.

Staff members probably got pretty tired of each other — at times no one could leave the center for as many as 15 days. The staff members who arrived every morning had no idea when

they would leave.

Since the fighting flowed in and around the center for much of the time, it was also difficult to tell who would be able to show up for work. Most of the time, Wehbe said, the center was manned by about 25% of its complement.

"If the fighting was heavy on the Christian side, the Moslem staff members would make it to work, but if the battle had gone the other way, the Christians would show up," he said.

Workload Continues

But even while the civil war raged between the Christians and Moslems the government continued to operate, so

civil servants on both sides of the battle lines had to be paid.

The center, which was slightly on the eastern side of the city, initially sent the payroll checks out with the Finance Minister, but he was killed in the fighting. At other times the checks would go out under a flag of truce.

An arrangement was finally worked out with the Bank of Lebanon — on the western side of the city — to handle the exchange of checks and documents needed with the two sides.

'Human Debugging'

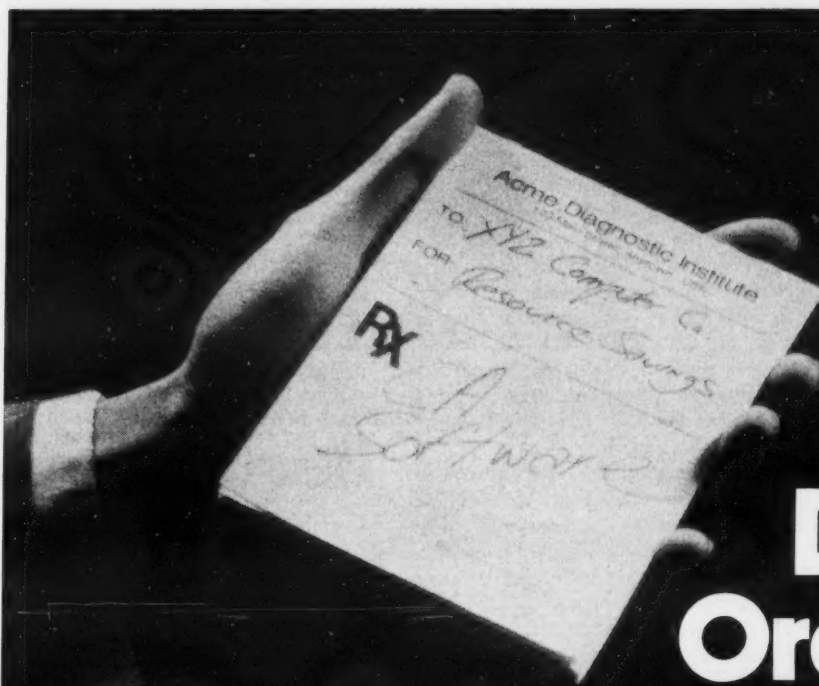
Because of the lack of electricity from the central power plant and the low levels of fuel supplies for its own gen-

erator, the center was very careful about the programs it ran and when it ran them.

For example, Wehbe insisted that programs be "human debugged" since he couldn't permit machine time for debugging. Each program was coded at least three times by different programmers, who would then come up with the best possible solution among them.

"Everything had to work right the first time — we couldn't afford failures," he said.

In addition, the center would often run only when temperatures were low enough so the air conditioning could be left off — thus saving valuable electricity. (Continued on Page 6)



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Few Agencies Log Personal Data Disclosures

(Continued from Page 1)

has employed computer technology to monitor disclosures of individual records.

The Air Force spent three to four months to design and implement an automated manpower accounting system called the Privacy Act Tracking System (Pats), he stated.

Right now, only the courts and individual citizens are the enforcers of the disclosure rules of the Privacy Act. "This requirement of the public's initiative and money is way too stringent," Braithwaite said.

The only additional oversight of the manner in which federal agencies handle their disclosure-accounting responsibilities comes from the House Government Operations Committee, chaired by Rep. Jack Brooks (D-Texas), and less regularly from the Office of Management and Budget, he added.

Agencies' Failure

Federal agencies particularly fail to log and account for their disclosures of personal data to other agencies, according to Braithwaite. The broad definition of "agency" in the Privacy Act itself permits such departments as Defense and Health, Education and Welfare (HEW) to argue that they are agencies and so may forego disclosure accounting of information passed among the organizations of which they are composed.

The disclosure of a file by the Air Force to the Navy can be viewed as an intraagency communication, he noted.

HEW has relied on this broad definition of the term "agency" in many of its efforts to uncover fraud and abuse in a variety of welfare, loan and benefit programs by the computerized matching of records. HEW's campaigns to track down runaway fathers, find welfare cheats and catch up with student loan defaulters are laudable — as long as they are accomplished within a legal framework, Braithwaite said.

At the heart of the Privacy Act and

its disclosure provision, however, is not the confidentiality of individual records but the accuracy of the information contained in them, Braithwaite stated.

Part of the point of maintaining thorough disclosure accounting records is so agencies can disseminate corrections to inaccurate files. "We suffer from the 'Extract' and the 'Derivative' problem. We proliferate errors in master data bases by extracting and deriving infor-

mation from individuals' records," he said.

"It's much harder to disseminate corrections to those errors when we don't know where all the information went in the first place," he continued.

Few systems are designed to take accuracy into account. Agencies seldom know how much accuracy is enough, Braithwaite said. He recommended that the sensitivity of a system be de-

termined by understanding and weighing the uses of the information it contains and by defining the potential impacts those uses might have on the individual.

Finally, Braithwaite tied the safeguards requirement of the Privacy Act to agencies' inadvertent disclosure of information. The law states that federal agencies must "clean up after themselves" to prevent the accidental disclosure of sensitive data.

Branscomb Proposes Unregulated ACS

(Continued from Page 1)

ACS, beyond DDS, were left totally unregulated and provided to the customers in a competitive marketplace, the value-added services provided by ACS could succeed or fail against other service alternatives," Branscomb suggested.

"The cost of the transmission facility of ACS would then be the standard price that DDS charges all its customers. And anyone, carrier or not, should be able to offer an ACS-like service built into the resale of DDS facilities," he proposed.

"This is clearly an entrepreneurial venture which has substantial technical risk, moves far down the path toward the offering of data processing services by a monopoly carrier and in any case will cost the Bell System a very substantial amount of money to develop," he added.

Acknowledging the impact of the 1956 Consent Decree on AT&T, Branscomb said it does not allow AT&T to offer unregulated services. The decree has an anticompetitive effect because without it AT&T would be able to engage in unregulated, competitive services and compete on the same basis as others, he said.

Under the provisions of the decree, incentive is provided to expand the government's regulatory reach to cover services which do not need to be regulated "in order to permit AT&T to

bring its very substantial technical and financial resources to bear on new innovative opportunities," he said.

Limited Regulation Proposed

Delivering the Compcon '78 keynote address, Sen. Harrison H. Schmitt (R-N.M.), a member of the Senate Subcommittee on Communications, outlined a framework for a new telecommunications act.

Such legislation should create a regulated public utility to operate self-sufficient, profit-making national communications for all types of information; it should create a competitive environment for communications services which are regulated only "to the extent necessary to prevent interference between various services," he said.

Using a highway analogy, Schmitt said the public utility should have prime responsibility for "major interchanges" within the national communications network. The public utility should also be responsible for defining technical standards to interface with the network.

The public utility defined by the legislation should have sole responsibility for services such as "long distance voice, urban private voice and electronic mail," he suggested, but added it is not yet clear exactly which service or combination of services should be included in these responsibilities.

The public utility should be allowed to compete "in the provision of other services and hardware outside its defined responsibility to operate the national communications net," he said.

Beirut DPers Under Siege

(Continued from Page 5)

tricity.

Although the center did have a relatively good supply of such perishables as paper, it economized by using the backs of old printouts as much as possible. Furthermore, it tried to have absolute perfection at the beginning of a print run so the run would not have to be repeated and spaced everything closely — "There was no paper just spewing out of printers like you often

see," Wehbe said.

Getting any upgrades was impossible, he recalled, noting that the center had ordered an additional 256K of memory along with disks and key entry equipment before the fighting began — and still has not received them.

One problem was just finding the IBM office. The firm would constantly have to move its offices because of fighting; when Wehbe could get someone to the main office, he would often find it deserted except for a security guard.

Another problem was the destruction of equipment that actually made it to Lebanon. Most of it could not get to computer centers before one side or the other destroyed it. Wehbe thinks his additional 256K memory was blown up on the docks of Beirut.

Tape Smuggling

Wehbe developed his own backup tape library during the fighting, smuggling out copies of tapes along with his clothes to parts of the countryside not affected by the fighting.

"I never told them there were tapes buried in the clothes I sent, I just asked them to hold the suitcase for me for a while. I had tapes all over the countryside of Lebanon," he said.

Any updates to Wehbe's operating system — DOS/VS — were of course, impossible, but maintenance on the release he was running was also difficult, causing him to go down to earlier releases several times. It was good that he saved some of the earlier releases on disk, he said.

Getting customer engineers was also a major effort. Several times army patrols had to be recruited to bring former IBM customer or systems engineers into the installation.

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Financial Aid Schemes Cited

Consumer Board Accuses DP Schools of Fraud

By Tim Scannell
CW Staff

ALBANY, N.Y. — A large number of vocational schools throughout New York state, including at least 15 DP-oriented institutions, have been accused by the New York State Consumer Protection Board of unfairly dipping into the \$67 million/year cash reserve intended for students in state and federal financial aid programs.

The schools, which offer training courses in everything from dog grooming to computer programming, often ignore their own entrance requirements and examinations in order to fill classrooms with as many grant- or loan-entitled students as possible, according to a report issued recently by the board.

In addition, these institutions paint an overly optimistic and sometimes false picture of the present or future job market to convince students to sign up for courses that may not prove helpful after graduation, the report charged.

The report also pointed out that salespeople hired by the schools on a commission basis often present themselves to prospective students as a particular school's "registrar" or "dean of students." Further, veterans or people from "economically deprived backgrounds" prove to be prime targets for their sales pitches because they are entitled to receive up to \$5,400 in financial assistance.

High Default Rate

Prospects are barraged with papers to sign, including applications for financial aid, the report continued. As a result, many students become "saddled" with federally subsidized and guaranteed loans they probably don't need and usually can't afford to pay back. In fact, the report noted, the loan default rate for vocational students is approximately 23%, double that of students in New York state as a whole.

The report, which accused the vocational schools of being the "true beneficiaries" of financial aid programs, also cited the schools' unusually high dropout rate — 30,000 students in the state last year.

DP schools and training centers, in particular, were cited in the report as having an extremely low placement rate. Although many of the schools extol the ease of finding employment in the DP field, Consumer Protection Board figures, included in the report, contradict the supposed simplicity of finding a job. Of the 8,327 enrollees who graduated from the state's 15 DP schools between July 1, 1976 and June 30, 1977, only 24% found employment.

A total of 6,289 students, or 76% of the total number who attended the DP schools in question, did not find jobs as a direct result of their training.

The board blamed each school's lax entrance requirements and money-centered recruiting techniques for the unusually high number of unsuccessful graduates. In one example, a person who allegedly had attended classes for the mentally retarded throughout public school, junior high school and high school, was admitted for programmer training at the New York School of Computer Technology. The

school's directors reportedly advised the candidate, upon his completion of an entrance test, that he would be a qualified computer programmer if he completed a 12-month, \$2,400 course.

A subsequent investigation by the State Education Department (SED), which oversees all vocational schools, revealed that the person in question "should never have been admitted to the school."

However, a school official contended the report is slightly "erroneous" because it only presented one side of that particular situation. "Nothing in [that person's] application ever mentioned anything about previous special schools or courses," Hyman Marcus,

president of the DP school, stated. Marcus claimed that the student cited in the report scored 76% on the entrance exam after having completed a one-week free-trial class.

The student "nearly finished" the entire program of courses, according to Marcus, and later approached school officials and demanded his money back under the threat of revealing information that would "create trouble" for the school. The matter, although not mentioned in the report, was later resolved, Marcus said.

'Small Leg Up'

The report also included a statement by Dr. Kenneth King, vice-chancellor

for university systems at City University, denouncing the value of attending any of the programs at the New York School of Computer Technology.

"The only benefit this course has to someone entering the job market is that it gives the person a small leg up over a person of similar background with no training," King explained. "For a programmer trainee, a college degree is often required, preferably in a computer science or some related field."

Marcus disagreed with King's statement, however, claiming, "We've placed most of our graduates . . . and they average about \$9,000 to \$11,000 per year to start."

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Floyd to Get Turing Award

NEW YORK — Prof. Robert W. Floyd of Stanford University has been named the recipient of the Association for Computing Machinery's (ACM) Turing Award for 1978.

Floyd has worked in many areas of computer science — programming language design, sorting algorithms, language and compiler theory, formal linguistics and mechanical theorem proving.

In announcing its choice, the ACM Awards Committee cited Floyd for "having a clear influence on methodologies for the creation of efficient and reliable software" and for "helping to found the following important subfields of computer science: the theory of parsing, the

semantics of programming languages, automatic program verification, automatic program synthesis and analysis of algorithms."

Floyd's current research is primarily in the area of algorithm analysis, in particular the theory of minimal algorithms, ACM noted. The professor is also working on the design and implementation of a language called Chiron, primarily for teaching structured programming systematically to novices, that is expected to be nearly universal in its capabilities.

The \$2,000 Turing Award is presented in commemoration of Dr. A.M. Turing, an English mathematician who made major contributions to the field of computing.

System/34 Cobol Unveiled

(Continued from Page 1)

cate in both a bisynchronous and SNA/SDLC mode with System 3/15s, other System/34s and 5110 CPUs emulating IBM 3740 data entry terminals, the source said. Previously, System/34s could interact only in a bisynchronous environment with System 3/15s, in a bisynchronous point-to-point environment with other System/34s and in a 3740-bisynchronous point-to-point environment with 5110s.

During bisynchronous transmissions, the SSP-ICF reportedly allows up to 16 users to share a System/34 communications link. With SNA/SDLC, the enhancement lets that same link support as many as 32 users.

IBM credited the SSP-ICF with permitting a common host processor to

transmit 9,600 bit/sec to "multiple" System/34s. Exactly how many of the minis the feature will connect to a central computer, however, depends on the number of communications lines and peripherals attached to the host, the IBM source explained.

SSP-ICF's high-level support derives from RPG-II and Cobol, which are said to treat the enhancement like a sequential file. The spokesman credited this high-level support with permitting program-to-program communications within the same system or between systems.

Other Enhancements

Some of the other enhancements IBM recently added to the System/34 include a workstation support subroutine, magnetic stripe reader, multinational character set and an A-font that expands the machine-readable character printing capability of the IBM 5211/2 printer. The remaining enhancements affect the company's System Support Program Product, Basic Assembler Language and Macro Processor Program Product and Utilities Program Product.

The workstation support subroutine suits all members of the IBM 5250 terminal series, including the 5252 CRT station and 5256 printer plus the 5251 CRT station models 1, 2, 11 and 12. Using a standard interface for a workstation data management and the SSP-ICF, the subroutine is said to simplify Cobol and Assembler programming instruction.

Like the workstation support subroutine, the magnetic stripe reader operates with the 5251 and 5252 CRT terminals. When users equip the IBM 5340 system unit with a Workstation Control Expansion Feature A, the magnetic stripe reader controls inventory as well as system access and security in manufacturing environments, IBM said.

The multinational character set provides a repertoire of 188 foreign language characters for the 5340, 5250 CRT terminal and 5211 printer. Intended primarily for users abroad, the character set forms alphanumeric displays in most major western European languages, the spokesman explained.

Like the multinational character set, the A-font mainly suits foreign users. IBM reportedly intended the print belt to produce letters and figures that could be read by optical character recognition equipment in European banks and retail establishments.

Deliveries of both the SSP-ICF and Cobol will begin in July 1979, with a \$75/mo license fee for both products.

Shipments of the workstation support subroutine and multinational character set also start next July. The character set rents and leases for \$2/mo and sells for \$76, while a monthly license for the subroutine costs \$15.

The magnetic stripe reader rents for \$13, leases for \$11 and sells for \$420 with deliveries beginning in January 1979, while the A-font costs \$170 and becomes available next month.

IBM plans to provide the other enhancements at no additional charge.

All the System/34 additions are available from the company's General Systems Division, which can be reached through Box C-1645, Atlanta, Ga. 30301.

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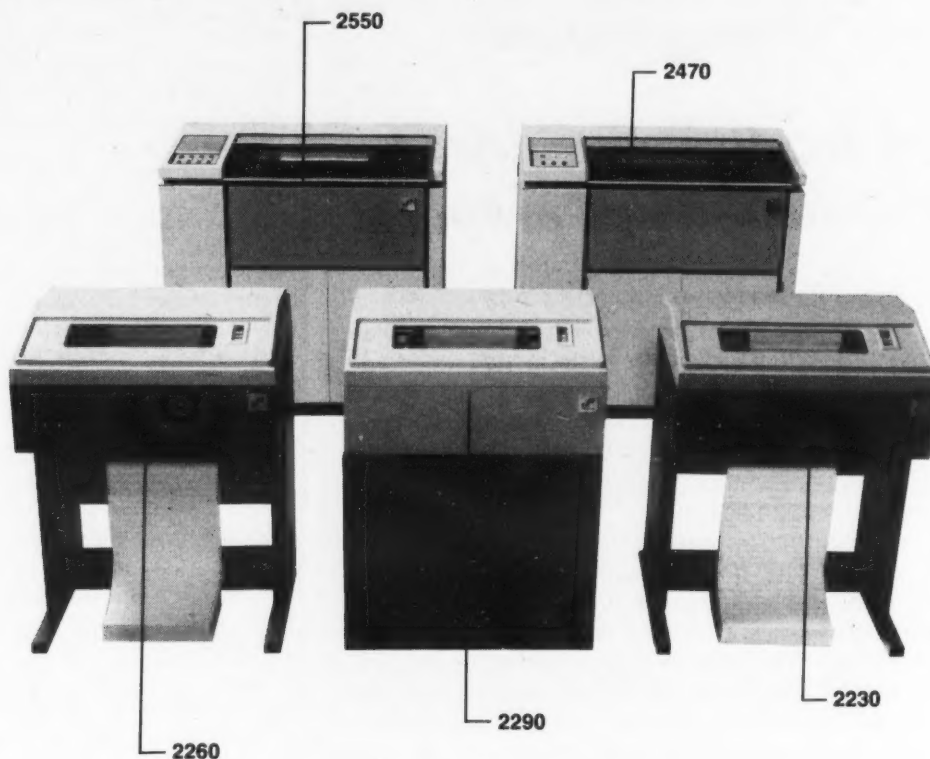
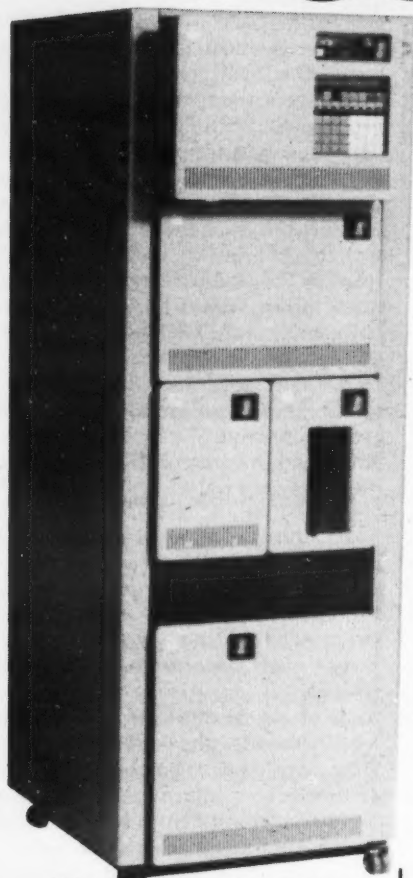
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Architecture-Specific RFPs Most Competitive?

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Architecture-specific requests for proposals (RFP) could — paradoxically — be the best way to obtain the most competitive DP contracts.

That's what the House of Representatives' Appropriations Committee was told by a staff committee investigating whether architecture-specific RFPs should be regular procurement tools for the federal government. The staff committee concluded that this ap-

proach would encourage computer vendors to provide cross-compatibility of architectures through firmware emulation techniques, benefiting users by eliminating the need for system conversion.

"Conversion is a protectionist strategy that complicates free and open competition to the advantage of the vendor. If the vendors chose, they could successfully compete against one another's product lines with plug-compatible equipment," the investigators contended.

The high cost of conversion is the most serious problem facing government DP buyers, they said, charging that vendors have a vested interest in keeping conversion expensive and RFPs nonspecific as a ruse to retain customers.

A user planning to upgrade a given vendor's CPU would be less attracted to another vendor's system if his current system's software had to be modified for use on the second system. He would be more likely to deal with his current vendor for an upgrade without conversion, the investigators explained.

On the other hand, if conversion was not necessary because the two systems were compatible, then the current vendor might well lose a chance of repeat business.

Navy Success

Prompted by the U.S. Navy's successful emulation of a Univac Anuyk-20 military computer system by a Control Data Corp. 5600 system, DOD recently employed architecture-specific RFPs in several procurements.

At a cost of \$30,000 "the CDC system emulated the Univac [system] perfectly and, simultaneously, increased the speed of the Univac programs from a 2 microsecond cycle time to 1 microsecond," the investigators found.

"Based upon the success of the exploratory project, the Navy concluded that architecture could be specified in a computer solicitation without restrict-

ing competition. On this presumption, it conducted a fully competitive procurement for computers to be installed in the F-18 airplane."

"The specification for the [F-18 systems] was nonspecific regarding supplier, but very specific regarding architecture; the winning vendor was required to provide a system which would process existing software from the Univac Anuyk-20 computer. The intent behind this requirement was that the Navy wished to protect its heavy investment in Anuyk-20 software," the investigators pointed out.

"The procurement was an unqualified success. Within 60 days, from the time of announcement until bid submission, four vendors provided computers . . . CDC, Univac, IBM and Lear Siegler [Inc.]. Each of the vendors was able to process the Anuyk-20 software without difficulty," they continued, noting that CDC won the procurement, while Univac bid the highest price of all.

The staff told Appropriations that DOD has completed two other architecture-specific procurements since the F-18 contract.

Standardized Components

The advent of plug-compatibility can be attributed to the standardization of computer system components that has become common in recent years, the study said. "The mass production of these . . . components has evolved the [computer] industry to the point that most of the basic electronic functions are the same — the primary difference from the user's perspective is the computer's architecture which derives its characteristics from special circuits in the computer, called firmware."

"Simply by changing a computer's architectural firmware, it is possible to process software that was designed and programmed for another machine," the staff said.

"If firmware emulation were explored as a means of avoiding conversion in the general-purpose computer area, there is the potential for completely obviating the need for conversion in some cases."

Conversion is a "disruptive, largely non productive process" that costs the federal government about \$450 million a year [CW, June 12].

The General Services Administration (GSA) has recommended that conversion costs be excluded from evaluation of government procurement lowest total overall costs (LTOC), the report to Appropriations stated.

GSA argued that government agencies tend to overstate these costs in order to justify the continued use of an incumbent DP supplier, the report explained. Some agencies have countered that conversion must be part of LTOC evaluation since it is a significant cost consideration that cannot be neglected.

The Appropriations Committee staff report said "both positions are valid, but the stand-off between opposing views seems to prevent a rational compromise."

Appropriations responded to its investigators' findings in a report now under Senate study [CW, Sept. 4]. This report cautioned that DP regulations based on the Brooks Act and certain "proprietary licensing issues" should be reevaluated before architecture-specific procurement is tried.

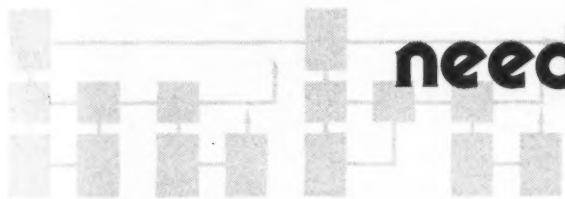
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The new edition features updated information on requirements for preparing and submitting unsolicited proposals to Uncle Sam. Included is an explanation of the new government-wide regulations concerning acquisition, contracts and awards. In addition, the book details the recommended standard format for unsolicited proposals now accepted by all government departments and agencies. It also provides: a list of common evaluation criteria generally applied to unsolicited proposals, information on how to identify and reach the right target for your proposal, and excellent guidelines for negotiating the best possible contract or award for your particular project.

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Attracts 1,070 Delegates Conference, Show 'Down Under' Held Success

By Doug Moore

CW Australian Bureau

CANBERRA, Australia — "The theme of the eighth Australian Computer Conference was 'Computers in the Service of Society,' and I think the speakers succeeded in covering the subject admirably" was how keynote speaker Lord Avebury summed up the conference.

Organized by the Australian Computer Society and known as ACS-8, the conference attracted 1,070 delegates, slightly below the expected figure of 1,200.

About 40 companies showed their wares at the accompanying exhibition, while a personal fair of microcomputers and hobbyist kits attracted another 30 exhibitors.

One of the highlights of ACS-8 was a concurrent conference called Junior ACS-8, attended by 150 students.

Dr. Chris Evans was the keynote speaker at Junior ACS-8. A psychologist and computer scientist who heads the Man-Computer Interaction Group and Speech Recognition Group at the National Physical Laboratory in the UK, Evans said the computer revolution would gather pace in the 1980s, when the general public would become aware of computers for the first time and mankind would have its first taste of exponential growth.

"Until now, change has been linear," Evans said. The 1980s will, he believes, see a change in the work ethic, an erosion of the power of professions, dramatic changes in the field of education and the growing lure of computerized games.

"The computer will become an extremely interesting companion with a lot of intellectual power," he predicted.

In the 1980s, the inertia of the establishment and its inability to cope with technological change will be emphasized, he added. "Man as a whole will feel the computer poses an intellectual threat."

Mankind soon will have to make a serious examination of ethical questions concerning machine intelligence, he said. "What should we do about extremely intelligent computers and about future computers that might have self-awareness?"

In the 1980s, too, a widening gulf between the West and the non-capitalist world will be evident, he declared.

"Some, if not all, of these things will happen in the 1980s. And we have a duty to think about that and decide what we're going to do if they come about," Evans told the conference.

In his keynote address, Lord Avebury said the question of the social impact of computers should be placed in the center of political debate.

Avebury is the chairman of UK peripherals manufacturer Digico and a former member of the British House of Commons Select Committee on Science and Technology. Referring to ad hoc studies, he said the trouble with them is that within a short time they are out of date.

"What is required is some means whereby the informatics community would continuously update decision makers about their technical capabilities, while at the same time there could be a dialogue on the social effects," he said.

"I would suggest an international center for informatics and society which could be set up under the aus-

vestigated by philosophers and scientists," Kitagawa said. However, "we want to make it absolutely clear that we are neither saying that the

knowledge-oriented era will certainly come nor claiming that the era, if it arrives, will make the lives of human beings happier."

CW At ACS-8

pices of the [Organization for Economic Cooperation and Development].

"Such an institution would recognize that apart from the detailed changes it would study, information technology is rapidly creating a degree of interdependence which our political institutions resolutely refuse to recognize," Avebury declared.

No Guarantee of Happiness

Dr. Tosio Kitagawa, the third keynote speaker, director of the Fujitsu-sponsored International Institute for Advanced Study of Social Information Science, told the conference the "knowledge society" of the future should be brought about by the voluntary participation of all human beings in the society.

"It is crucially important for every scientist to have a keen recognition of the roles of information science, which will give him many channels of communication among different areas of science," he said.

It would not, he said, be absurd to imagine that current institutions for administration, regulation and planning would be replaced by a suitable set of "knowledge information" systems.

If, he continued, a future society is considered in which knowledge and information would be the predominant factors, then one might ask how the existence of nations can be justified.

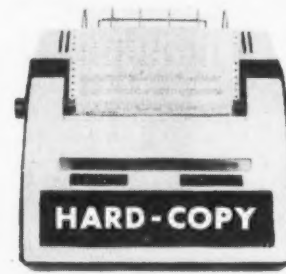
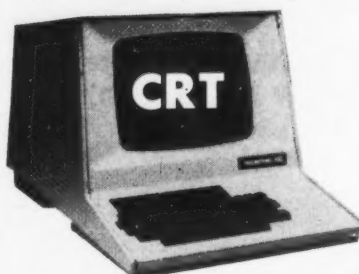
"This might become an important theoretical subject to be thoroughly in-

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Competitive Bids in N.Y. Could Save \$2 Million

By Don Leavitt

CW Staff

NEW YORK — New York City could save approximately \$2 million in fiscal year 1979 if it used competitive bidding procedures to get needed DP equipment instead of issuing sole-source.

At least that is what New York State Special Deputy Comptroller Sidney Schwartz described as a conservative estimate of the possible savings

for the financially beleaguered city if it changes the way it goes after big CPUs and peripherals.

Schwartz made the comments in a report to the city's Emergency Financial Control Board (EFCB) — a report in which he reviewed nine large contracts that were conferred in the 17-month period from Jan. 1, 1977 to May 31, 1978. None of those contracts — with a total value of \$11 mil-

lion — were awarded as a result of competitive bidding.

Instead, six bids we submitted under an open market purchase agreement with IBM. The agreement was awarded without competitive bidding and was based on standard IBM prices, Schwartz said.

The other three acquisitions were made through purchase contracts that were also let without the solicitation of competitive bid.

Schwartz followed a "dollars-and-sense" approach in his appraisal of the situation. He acknowledged the use of IBM or IBM-compatible equipment "is important to the city because of its large investment in IBM equipment."

"However," he added, independent vendors of IBM equipment and manufacturers of IBM-compatible equipment offer prices ranging from 10% to 50% less than those cur-

rently charged the city by IBM for some equipment."

To emphasize the growth in the IBM-compatible market, Schwartz included a chart matching Control Data Corp.'s Omega 4801 and 4802, Intel Corp.'s AS/4, 5 and 6 and Amdahl Corp.'s 470V/5, 6-II and 7 to IBM's 370s and Series 30 processors.

The city has not awarded contracts to any of those vendors, Schwartz added, noting, however, that when his staff had "spoken with two manufacturers and distributors of plug-compatible computers, each had expressed enthusiasm for doing business with the city."

Two third-party vendors expressed reluctance to deal with the city during its then current financial crisis, he continued, "but they indicated a desire to do so after federal loan guarantees are obtained." These guarantees have been gained since Schwartz spoke to the firms.

Peer Committee

Moving to another area of concern, Schwartz said the city's Office of Management and Budget (OMB) told his staff it uses a peer committee, staffed by people from the City Comptroller's Office, OMB and the requesting agencies, to study each agency request for DP equipment and make the selection.

On the other hand, OMB "was unable to provide procedures, selection criteria, records of deliberations or the names and assignments of committee members," the state official asserted, adding that the City Comptroller's Office "denied knowledge of, or participation in, such a committee."

The fire department "informed us that it alone had selected its computer system" — a Univac 1100/11, the only non-IBM equipment of the contracts Schwartz reviewed — "without participation of any peer committee," he said.

According to Schwartz, OMB told his office that an agency's justification for upgrading or adding to its particular configuration is stated in the agency's request letter. On the other hand, "OMB was not able to provide such request letters" for review.

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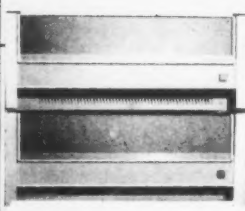
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Attacked for 'Deafening Silence'

Australians Accused of Ignoring DP's Effects

By Frank Rees
Special to CW

CANBERRA, Australia — A prominent executive of the Australian Computer Society (ACS) has launched a blistering attack upon the society, charging it with apathy and indifference toward the effects of computers upon Australian industry and commerce.

Ashley Goldsworthy, a past ACS president and currently chairman of its Social Implications Committee, made the attack on the eve of the society's Eight Australian Computer Conference (ACS-8), held here in the national capital recently.

Referring to a month-long strike by

Australian telecommunications technicians over the introduction of computerized telephone technology,

CW At ACS-8

Goldsworthy said, "We have seen in recent weeks a sudden and explosive awakening to the impact of computer technology. The ACS is the one organization which represents computer professionals in this country. Its silence in the public arena has been deafening."

He accused Australian computer practitioners of having a myopic interest in the technical aspects of their subject, but little interest in its social effects upon Australian life. "The leadership of the ACS should hang its collective head in shame at its inaction, its lack of involvement in this debate and its abdication of responsible professionalism," Goldsworthy said.

In 1974, as ACS president, he pointed out to the Australian government the urgent need to consider the future influence of computers on Australian life. He warned then that computerized technology would affect the occupational structure of the Australian workforce and advised the gov-

ernment to plan for the necessary industrial adjustments.

Now, after the telecommunications strike, which threatened the total communications structure, others have recognized, if belatedly, the meaning of Goldsworthy's warning. The dispute between Telecom, the Australian statutory telecommunications authority, and the Australian Telecommunications Employees Association arose from Telecom plans to introduce computer-controlled telephone switching systems.

This would have led to the downgrading of staff and redundancies, the technicians contended. Telecom conceded the computerized technology would render some technicians redundant and diminish the chances of promotion for many more, but it insisted on the sole right to determine how such computer-based innovations should be implemented.

The dispute is seen in Australia as widely significant because it was the first serious test case of the Australian trade union movement's future role in the transition of Australian industry to computer technology.

The strike was ended by arbitration, and Telecom was forced to make major concessions. Among them, the union gained the right to take part in decisions on the introduction of computer technology into Australian telecom-

(Continued on Page 16)

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Women Earn Less Than Men In New Zealand

CW Australian Bureau

AUCKLAND, N.Z. — Women DPs in New Zealand are paid less than men for the same work, according to a paper by Dr. Colin Boswell and Peter Melhuish.

Delivered at the New Zealand Computer Society's sixth biennial conference here recently, the paper was based on a survey of computing as a career in this country.

The five most important variables that determine salary are, in decreasing order, the number of years in DP, whether the individual is a DP manager, the individual's age, the individual's sex and whether the employer is a consultant, the survey revealed.

Almost 75% of the 800 respondents to the nationwide survey of people involved in DP said they found their jobs satisfying or very satisfying, and only 2%, very unsatisfying.

But DP is a young man's world, the survey showed. Two-thirds of the respondents were between 23 and 36 years of age and more than four out of five were men.

Most have not been in the profession very long — with 36% indicating four years or less while half have been involved for less than six and one half years.

The authors calculated there were about 4,100 people involved in programming, systems analysis and management drawing, at the beginning of 1978, average salaries of about \$10,000.

What you should know about Recovery Operation Centers --before it's too late.

These are not pretty words: Fire. Flood. Explosion. Earthquake. Tornado. Sabotage. And they don't mean pretty things.

What would happen to your company if one of these disasters struck your computer operations tomorrow? What would happen to cash flow? Business momentum? Customer service?

The truth is that a company not prepared to deal with a potential computer disaster could be wiped out in today's competitive business environment...and it could happen in minutes.

What we've learned

Data Processing Security, Inc., for a decade, has been dealing with these emerging problems...counseling some of the most important names on the Fortune 500 list, as well as hundreds of other firms around the nation. One of our jobs has been to develop state-of-the-art contingency recovery plans.

We've learned something every company in America with a computer operation needs to know: The off-site Recovery Operation Center (ROC) is the answer to dealing with disaster problems that could otherwise literally stop a company in its tracks.

That is why DPS has developed the ROC. It's the answer to true disaster recovery. We will build five of them at regional centers across the nation.

It is not for everybody. A ROC is designed for companies dependent on their computers — those which can't afford to be down for an extended period of time while another computer facility is being built.

The time to investigate a recovery program such as this is now, when you don't need it.

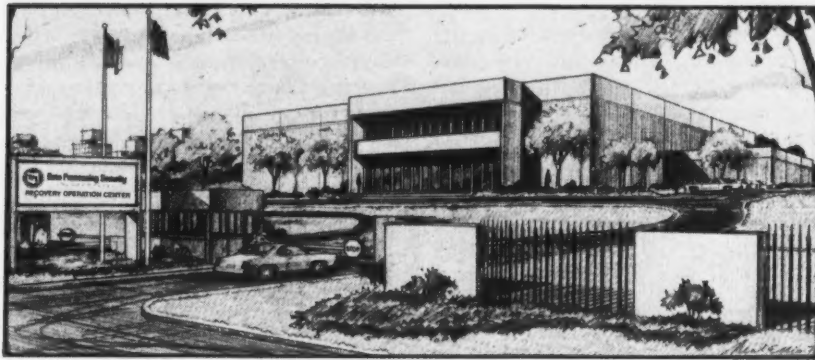
But do investigate before you commit time and money to a backup computer facility. The following information will provide you with some basic information about Data Processing Security's ROC program.

What is a ROC?

A Recovery Operation Center is a pre-engineered, -designed and -constructed computer facility with the necessary telecommunications network, power supply, air conditioning, raised flooring, security and fire protection to accommodate immediate computer installation. Like a military command post, it is maintained in a constant state of readiness.

Today's computers are complex, sophisticated and highly specialized. There are three primary reasons why a ROC is necessary:

- **Availability:** Most companies, including



Recovery Operation Centers to be built by Data Processing Security, Inc. will be able to accommodate a client's recovery needs in a matter of days.

Service Bureaus, operate their computer systems at or near capacity and simply cannot afford to provide necessary backup computer support to another company.

- **Compatibility:** Our experience has shown us that most companies lack computer compatibility, in both hardware and software.
- **Communications:** Again, experience has shown us that most communications networks are custom designed for a user's specific needs and no one else's. And these networks are rarely compatible with another firm's communications network.

Because it effectively deals with these factors, a ROC is the most realistic, practical and cost-effective solution to reducing a company's exposure in the event of an unavoidable disaster.

Where will ROCs be located?

ROCs will be located in the following geographical areas: Dallas/Fort Worth, Los Angeles, Chicago, New York and Atlanta.

The first ROC, an approximately 50,000-square-foot facility, will be built in the Dallas/Fort Worth area. It is designed to accommodate three IBM 3033s (or their equivalents), plus it has the necessary operating space to support the data processing function. The cost to be a member of this backup computer facility will be \$1,000 per month.

What if a disaster strikes a ROC?

Each ROC will be backed up by one another through a nationwide communications network. This backup capability assures members that if a disaster strikes a regional ROC facility, and/or if more than three

members are affected by a major disaster, their communications networks could quickly be diverted to another ROC in any of the other regions.

Will the ROC have a computer installed?

Not initially. However, after the ROC has been built, DPS will conduct a thorough feasibility study for those members interested in and requiring common systems. This approach has

proved to be the most economical; ROC members pay for what they need and nothing more. If the study shows installation of a computer to be the best strategy, and if justified by costs, then a computer could be put into the ROC.

Be cautious about entering into a backup agreement with a Service Bureau because more than likely they will not be able to support your recovery needs for the extended period of time it will take to reconstruct or build a new computer facility.

What about delivery of computer and communications systems?

DPS will assist ROC members in negotiating with their respective computer manufacturers to expedite the shipment of their replacement computers within the critical response times necessary in the event of a disaster.

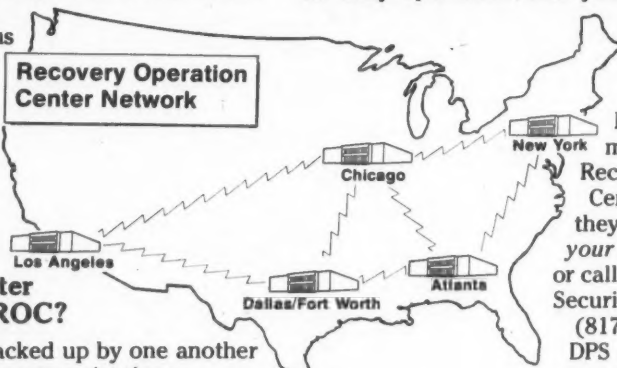
DPS also will assist ROC members, after reviewing their telecommunications needs, to secure and install common types of modems and communications equipment. An analysis of these needs will indicate which members can share common data communications systems.

Don't wait until it's too late! If your company depends upon its computer system for daily operations, then you must realize

what could happen if you didn't have that capability.

For more information about the Recovery Operation Centers and what they can mean to your business, write or call Data Processing Security, Inc., (817) 589-2244.

DPS is the leading management consultant in computer security, the proven name, advancing the state of the art through its work with 400 major corporations.



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Exhibit Extends Options 'Down Under' Micro With 'Movable Window' Screen Debuts

By Doug Moore

CW Australian Bureau

CANBERRA, Australia — Many products new to the Australian market were shown at the exhibition of the Australian Computer Society's Eighth Australian Computer Conference (ACS-8) here recently.

One of the most impressive introductions was the ECS 4500, shown for the first time in public by its developer, Electronic Control Systems of Sydney.

The ECS 4500 is a good-looking microcomputer based on the Zilog Z80 microprocessor. It offers Basic, Fortran and Cobol and supports 1M byte of minidisk storage.

Its screen is said to act as a "movable

window," enabling users to view any part of memory. Communications with any mainframe are possible, ECS

CW At ACS-8

said.

The concept behind the 4500 is that the processor, display subsystem and disk subsystem all share the one memory space, the company explained. The operating system assigns the specific area accessed by each device.

The system features 158 instructions,

a 25-line, 80-column display system with a 256-character set and a 64K-byte memory address space with the facility to switch multiple 16K blocks into the address space.

"Viewdata" Type System

Telecom, Australia's telecommunications authority, demonstrated a teletext system broadly based on the Prestel (formerly Viewdata) system being developed in the UK. However, a Telecom spokesman said the authority is not yet committed to providing a teletext service because the Australian market for such a service has not been assessed and the problem of who should provide the data has not been

solved.

NCR Corp. launched its Model 643-118 computer output microfilm (COM) recorder and its Model 1770 self-service financial terminal.

Control Data Corp. demonstrated the graphics capabilities of its Plato system using two terminals driven by cassettes. Plato, a computer-aided instruction system, is expected to be available in Australia later this year.

Tektronix, Inc. displayed its Model 8002 microprocessor development lab as well as a range of graphics terminals. The company announced its Model 4027 color graphics terminal and Model 4016-1 CRT terminal, which are expected to be available from the U.S. soon.

A Fish Story

Undoubtedly the highlight of the exhibition was a CRT terminal which operated while submerged in a fish tank as goldfish swam gaily by.

The Model 135 is made by Information Electronics, a Canberra-based company.

It was described as an environmentally sealed, ruggedized CRT capable of functioning as reliably as an office terminal in hostile environments.

Based on dual microprocessors, the Model 135 can operate continuously in temperatures from 0 to 50°C. Its non-glare screen displays 25 lines of data and offers inverse dual intensity plus two-page display with scrolling, the company said.

Editing from the keyboard or CPU is provided and preshipment checks include 24 hours of operation "burn in" at an elevated temperature plus vibration checks to shake out the bugs, the company added.

Australian DPers Hit for Silence

(Continued from Page 14)

munications.

It is generally now admitted that the strike might have been avoided altogether had the Australian government considered the impact of the computer-based technology on union attitudes early enough, as the president of the ACS urged some four years ago. However unpopular Goldsworthy may be among his colleagues in the ACS, both Australian press and politicians have acknowledged his main point — that the growth of computer technology has caught them unaware.

Certainly the Telecom strike demonstrated that a major government agency — the largest employer in the country — grossly underestimated the reaction of the trade union movement to computer technology. The Luddite reaction was inevitable.

One politician proposed a levy on computers, based on the cost of retraining the people whose jobs had been lost. How Australian industry, burdened with such a levy, was to compete successfully with others using computers freely was not explained, nor was the question of what the displaced workers were to be retrained for — Australia now has more people unemployed than at any time since the Depression.

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"Got your assembler language text yesterday and stayed up half the night reading it. The book is great."

Programmer
East Hartford, Conn.

3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

"As I read through the book and began formulating questions, I found that every question was answered shortly afterwards. I have never felt so comfortable with a subject that has always made me a little uneasy."

Programmer
Indianapolis, Ind.

Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, sub-routine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

"Your book has been a tremendous help to me. I would recommend it to anyone."

Systems Analyst
Omaha, Nebraska

Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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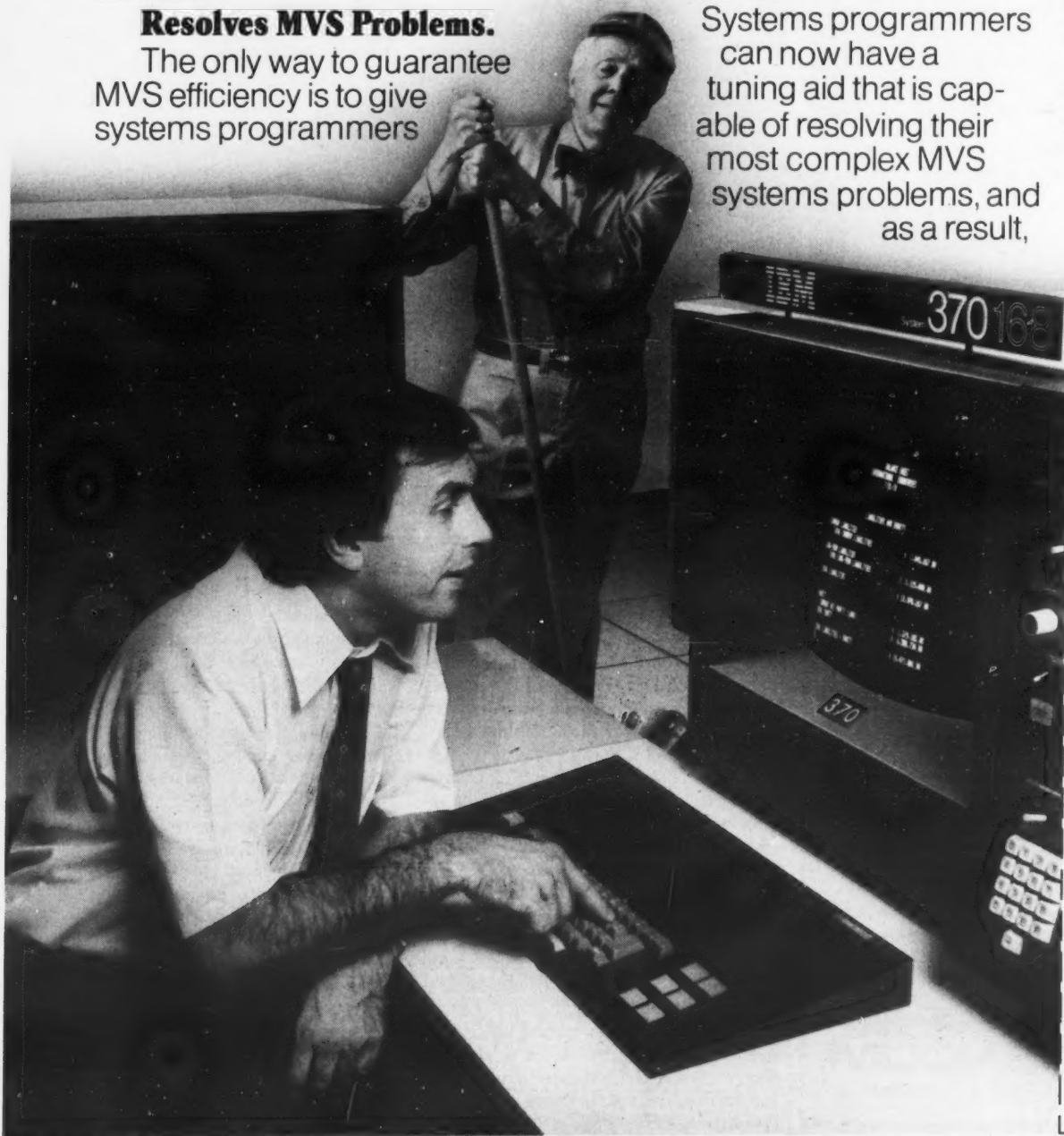
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With 58,000 Vacuum Tubes . . .

Air Force's 'DP Dinosaur' Still Effective Bulwark

By Bill Hiniker

Special to CW

A current TV commercial run by a computer company compares the vacuum tube computer to a dinosaur. But if, as the ad implies, tubes have gone the way of prehistoric lizards, nickel candy bars and other things extinct, somebody forgot to tell the U.S. Air Force's IBM AN/FSQ-7. It contains

some 58,000 of the supposed relics.

Seven Q-7 computers are the backbone of the Semi-Automatic Ground Environment (Sage) system, which has helped guard the U.S. against air attack since the 1950s.

"But just because it's old," said one repairman who was still in diapers when the system was installed, "doesn't mean it can't still do the job."

Senior Master Sgt. Howard Gillis agreed, and he has proof to back his claim: "We're on the air better than 99% of the time." Gillis is chief of computer maintenance for the 26th Air Division, which maintains a Q-7 at Luke Air Force Base near Phoenix, Ariz.

Other Q-7s are located in Washington, Canada, Montana, Minnesota, New York and Virginia. They tie to-

pulses to feed data to the Luke computer via lines leased from the telephone company.

The Q-7 reconstructs the radar picture and displays it on radar screens in the 26th Air Division's control center and command post. The Q-7 also compares aircraft detected by radar with prefiled flight plans stored in its memory and sounds the alarm if the two

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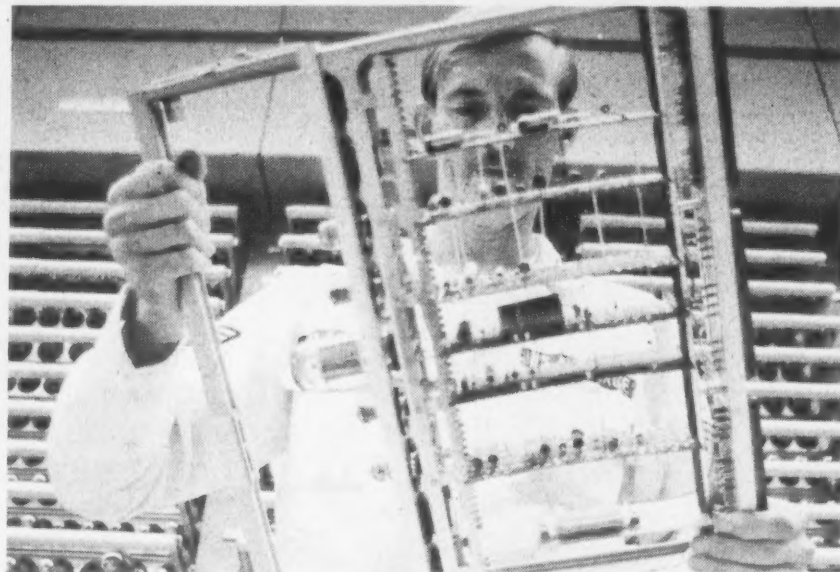
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Photos by Staff Sgt. B. Hiniker, U.S. Air Force



Sgt. Pat Flanagan (top), a computer technician with the 26th Air Division at Luke Air Force Base, near Phoenix, examines a pluggable computer unit from the giant Q-7 while (below) repairman troubleshoots. The computer contains 58,000 vacuum tubes arranged in 7,300 pluggable units.

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gether radar returns, command and control elements and fighter interceptor aircraft to allow the Aerospace Defense Command (Adcom) to carry out its bomber defense mission. Adcom also provides warning of missile attack.

At Luke, the Q-7 is the brains behind the 26th Air Division, which is responsible for defending more than a million and a half square miles of the Southwest from air attack.

The system covers the entire first floor of the 26 Air Division's football field-sized Sage center headquarters. The three-story, windowless center also houses display and communications equipment which links the Air Division with radar surveillance sites along the California coast and U.S.-Mexican border, fighter interceptor aircraft units in three states and higher headquarters.

The radar stations use electrical im-

don't match.

If the unknown aircraft can't be identified by transponder or radio, interceptors are scrambled to visually identify the plane.

A special feature of the Q-7 called Data Link allows the computer to "talk" directly with computers on board the airborne interceptor aircraft and keep the pilot constantly apprised of his target's location.

Despite 58,000 vacuum tubes and 32 million separate parts, the Q-7 is a very basic computer, according to Master Sgt. Larry Rousselle, who's been working with it on and off for more than 15 years. "It's really very simple to maintain," he said, "although it needs more maintenance than newer models."

"It's a first-generation computer—all vacuum tubes," Rousselle remarked. "They say there's between 55,000 and 58,000 of them, but I've never both-

... And 1.3 Million Feet of Wire Against Invasions of American Air Space

ered to count."

With today's technology, a computer with the Q-7's capabilities could be installed in a telephone booth.

"The Q-7 was designed in the late '40s, early '50s," he said. "That was before transistors, and long before anyone even dreamed of integrated circuits." The Luke computer was installed in 1961.

Gillis said even computer talk has changed since the Q-7 was new. "For

"They just don't make many of them anymore."

Adcom once operated more than 30 AN/FSQ-7s in Sage centers scattered around the country. But the system's increased capabilities and Air Force efforts to reduce operating costs teamed to close down all but the seven centers still in operation.

According to Rousselle, a number of the computers have gone on to second careers. "When they closed down the

The redundancy also lets 26th Air Division officials schedule simulated exercises without cutting into the unit's combat readiness.

Maintaining a computer system designed in the aftermath of World War II and installed when John F. Kennedy was President has its problems. One of them is training.

Air Force computer schools concentrate on state-of-the-art systems, not

20-year-old computers. "Most of our new people have never seen a vacuum tube until they get here," Rousselle said.

But, Gillis pointed out, "we can really teach them a lot about computers. Here, they're not just working on a computer, they're walking around inside one."

Hiniker is a U.S. Air Force staff sergeant.



Flanagan pulls a pluggable unit from the Q-7.

instance," he noted, "now information is measured in bytes; we still work with bits. And we measure speed in microseconds, not macroseconds."

Gillis said the Q-7 is capable of 64,000 computations a second, which is low by today's standard.

Despite its age, Gillis and Rousselle agree the Q-7 has yet to be improved upon. "This system was designed especially for air defense," Gillis pointed out, "and it still does a good job at it."

Richard Brown, IBM's advisor to Sage, said current plans call for the system to be replaced by a smaller, more economical system in the early 1980s. "Sage is still very reliable," he said, "but as it gets older, we find things failing that have never failed before. We've never come up against a problem we can't handle, though."

Obtaining replacement parts has become increasingly difficult over the years. "Many of our vendors have gone out of business," Brown said.

"It's hard to buy a vacuum tube for anything these days," Rousselle added.

other centers, most of the components were sold off by the pound as scrap. But several were bought up by movie and television studios. They use them as props, mostly in science fiction shows."

He listed television's "Voyage to the Bottom of the Sea" and "Time Tunnel" and Woody Allen's movie, "Everything You Wanted To Know About Sex But Were Afraid To Ask," among the system's screen credits.

"It's funny to see our system used as background in a show about flying saucers or submarines," Rousselle said.

"It was a big job to build this thing," the young repairman said as he looked over one of the Q-7's 7,300 pluggable units. "It's hard to believe this was all wired by hand." He pointed at a bundle of wires as thick as his wrist. "That was a big job... they say there's 1,300,000 feet of wire in this thing... 1.3 million feet..."

The Q-7 is actually two computers, linked together to ensure continuous operation. "Identical data is fed into each computer," Rousselle explained. "That way if we have to shut down the active computer, the standby can take over right away."

A Message To Ponder

Special to CW

NEW YORK — A novice in a DP center here called for help one day. "The computer won't solve my equations," she said. "It keeps giving me the same error message."

A colleague attempting to help asked her to read it aloud. Not believing her reply, the colleague said, "Please repeat that."

And, anthropomorphizing the binary worker, the novice read aloud, "Missing erogenous variables."

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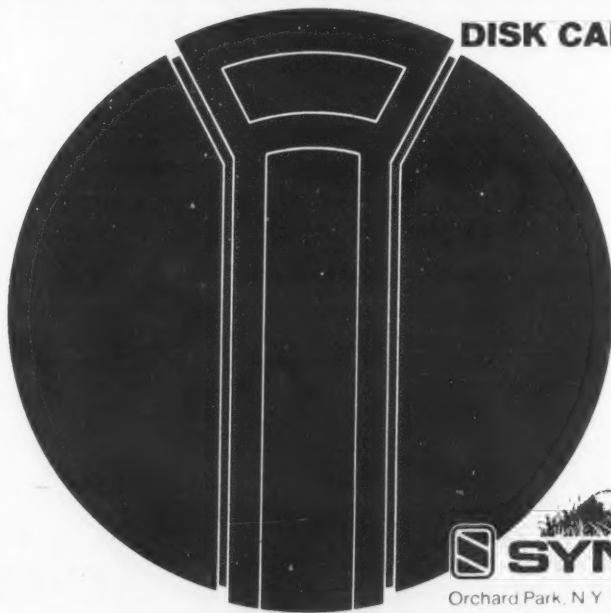
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Last Grain Exchange 'Trades in' Chalkboard

By Ann Dooley
CW Staff

MINNEAPOLIS — The Minneapolis Grain Exchange recently traded its old chalkboard and about fourteen human price markers for an automated display board that can change as many as 60 different numbers every second.

In executing the trade, this 100-year-old institution was the last such major exchange in the country to bring technology to its trading floor, according to Dustin Mirick, assistant secretary for the exchange.

The electronic display board, which measures 75 feet long and 16 feet high, can change nearly 3,600 numbers each minute, and that speed is appreciated by the traders who must make split-second decisions on when to buy or

sell wheat, corn, soybeans and other grains, Mirick said.

The \$400,000 system consists of two Quotron Systems, Inc. 801 minicomputers with 32K bytes of memory each and 12 keyboard CRTs. The software, called the Central File Floor Automation system, was developed by Quotron.

Data Over Phone Lines

As information on commodities from the Minneapolis Grain Exchange's own table as well as trade action from the Chicago Board of Trade, the Chicago Mercantile Exchange and the Kansas City Exchange are transmitted over phone lines to one of the CPUs, the information is deciphered and transferred to the board.

The information appearing on the board includes the type of commodity, the prices at which the commodity opened and closed, its highs and lows and the price for contracts as they change.

This information can also be obtained from one of the CRTs which list current prices and past trading action from a file maintained in the system. The system can give traders this kind of information from any board exchange in the U.S. or Canada, Mirick said.

The display board does not use lights, but consists of 35 small disks painted black on one side and yellow or green on the other. The disks, used to form each number, are magnetized; the computer is programmed to flip

the disks colored side up in the shape of the required number.

Some software problems occurred during the conversion period, Mirick noted. The software is so highly modified that it was essentially untested, he explained.

Although some problems are still cropping up, the board and software are reliable now and running very well. "We went through a six-month dual conversion period, but have stopped running under that system now," he said.

There are two backup systems in case of problems: a visual display of the actual ticker lines indicating the trading prices — and the now-retired chalkboard. If a major problem occurs, it is possible to revert to either of these systems.

Flavor Missing

While the computer is a step forward, the human board markers have "provided a lot of flavor that's certainly going to be missed," Brooks Fields, trader for Burdick Grain Co., said.

A former board marker reminisced that "when things really got rolling, the board markers hardly had time to breathe; chalk dust would fly, settling in their eyes, their nose, their hair."

And, she added, there's one thing a computer won't have to worry about: when the markers fell behind or were blocking the traders' view, the traders would let the markers know about it by yelling.

The switch to the automated system was made for increased speed and accuracy, as well as for clearer viewing for the traders. The exchange would also like to see some long-term cost savings benefits, he added.

Quotron was selected to supply the system because it had done similar kinds of systems, Mirick said.

The markers — mostly women — are now working at other jobs at the exchange or have gone back to school, he said.

What Keeps Your Communications Equipment Running Smoothly?

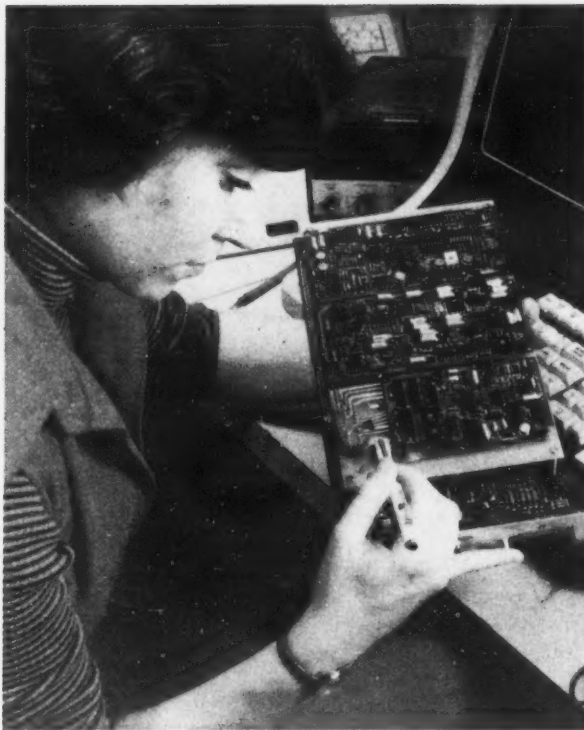


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GENERAL  ELECTRIC

UK Firm Plans To Print Journal On DP, Privacy

GUILFORD, England — IPC Science and Technology Press Ltd. will launch a bimonthly international journal, *Information Privacy*, this month.

The journal will examine hardware, software and security considerations as well as social implications, the needs for and application of legal controls and codes of conduct and practice.

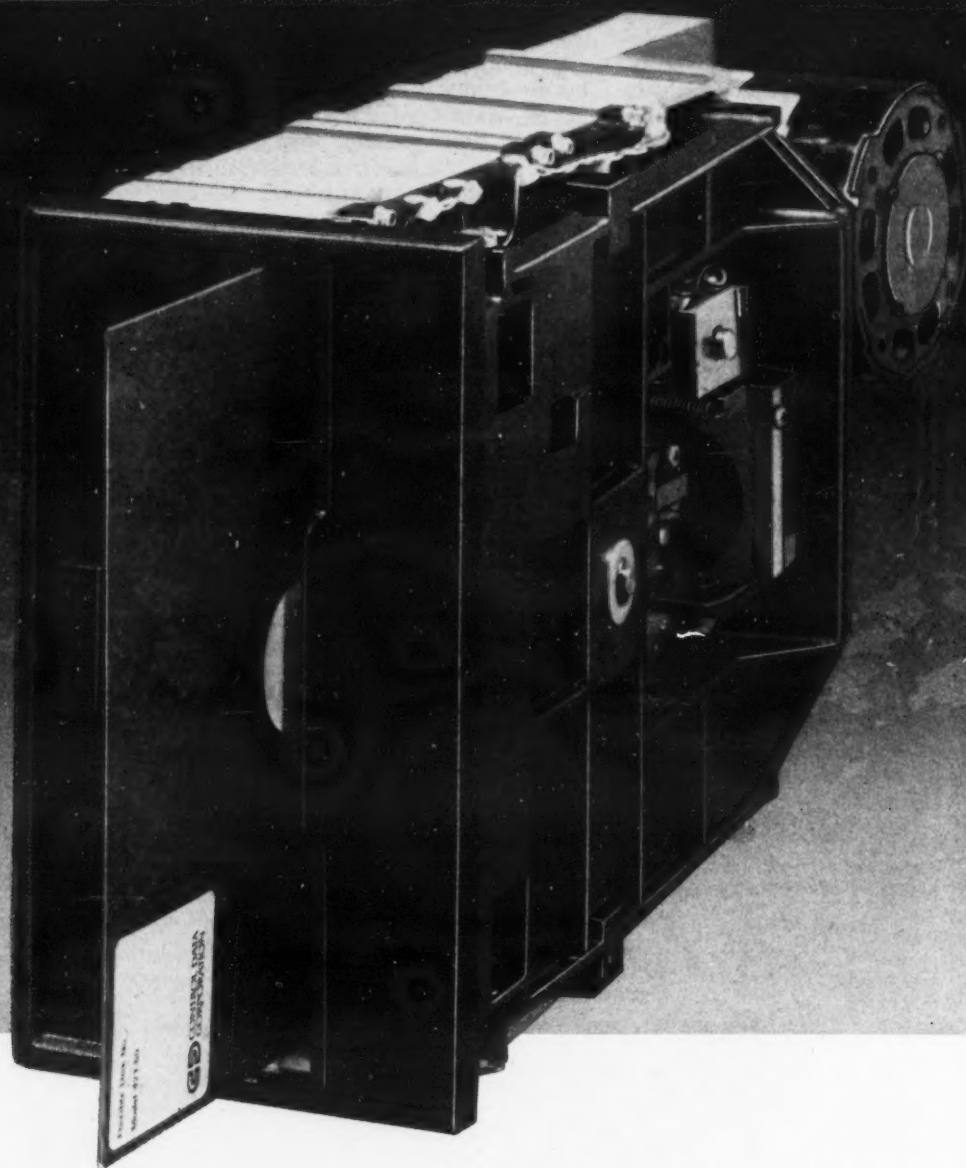
Each issue of the journal will contain five or six papers, industry news, reviews of international groups working on privacy topics, details of legislation and practice and conference reports.

The publication is aimed at computer engineers and designers, systems analysts, programmers, data processing managers and high-level management.

The journal has issued has issued a call for papers on subjects relevant to the journal.

Subscription rates will be approximately \$68 per year. Further information is available from IPC Science and Technology Press, IPC House, 32 High St., Guilford, Surrey GU1 3EW, England.

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Net Propels Air Show Scores to Remote CPU

CLEVELAND — For the dozens of pilots who flew their planes in either or both of the air races at Burke Lakefront Airport in Cleveland over Labor Day weekend, the real excitement started just a few seconds after the competition ended.

By that time, thanks to Honeywell, Inc.'s Datanetwork and a software program designed to score air races, a Level 66 computer more than 500 air miles away in Minneapolis already was generating a cockpitful of statistics, including a complete list of all entrants' times, speeds and order of finish.

Harry Endrulas, a senior systems representative at Honeywell, developed two software programs, one each for the Lake Erie Air Derby and the Cleveland National Air Show Speed Race.

"Each race was limited to 50 aircraft," Endrulas said. "The winner of the Air Derby was determined by a combination of how closely the pilot estimated actual speed and fuel consumption, while the Speed Race winner was the pilot who attained the highest average ground speed in relation to a predetermined handicap."

"The fact is that the last plane down in both events could have been the winner, so we had to find a way to get final results in a hurry. A computer was the logical solution," he said.

Derby Details

Contestants in the Derby on Sept. 2 chose their own speed handicaps in miles per hour and their own fuel handicap in gallons per hour. The purpose of the event was to measure the pilots' ability to fly a cross-country course according to their chosen speed and fuel handicaps.

Final scores were determined by matching each contestant's actual speed against the handicap speed and actual fuel consumption against the fuel handicap, with each category accounting for half the total.

If a pilot estimated he would fly at 118 mile/hour, for instance, but actually averaged 118.03, his proficiency rating would be 99.97%. If he also predicted his plane would consume 25.1 gallons during the race but it actually used 24.8, his proficiency rating would be 98.8%.

By combining the two ratings and dividing the total by two, his overall score would be 99.39%. Thus an individual who accurately predicted his exact speed, but who consumed a lot less fuel than he anticipated, would stand little chance of winning.

The winning team was sixth in predicting its miles per hour and first in estimating fuel

consumption. Its overall proficiency rating was 99.45, Honeywell said.

As soon as the last plane was "topped off" (refueled), Endrulas sent the actual starting time, finish time and fuel consumption for all planes via a terminal to the Level 66.

The system already had on file the names of the pilot and co-pilot, the plane manufacturer or type, the plane number, the contestant number

and the speed and fuel handicaps. Within minutes, the system digested the numbers and provided both proficiency ratings and the final scores.

All pilots received a copy of the final statistics during the award ceremony. Cash prizes of \$300 down to \$50 were awarded to the top five contestants in the race, which was sponsored by the Lake Erie Chapter of the 99s, a national organization of women pilots.

First-place winners were: pilot Jon Sobel and co-pilot Valerie Pluto. Other winners included pilot Marcia Klein and husband Spencer Klein as co-pilot, second place; Jon Speer and Carole Pendleton, third; Pauline Mallary with co-pilot husband L. Peter Mallary fourth; and fifth, Pat Friedman and Harlene Milani.

The handicaps for the Speed Race are determined and published each year prior to

the race and are final for all planes in that year's event. The race was limited to production models of airplanes with nonsupercharged engines of not less than 145 nor more than 520 horsepower.

Once again, Endrulas fed data into the system as soon as the last plane touched down. Final scores for all pilots was available in seconds and prizes were presented to the first five finishers.

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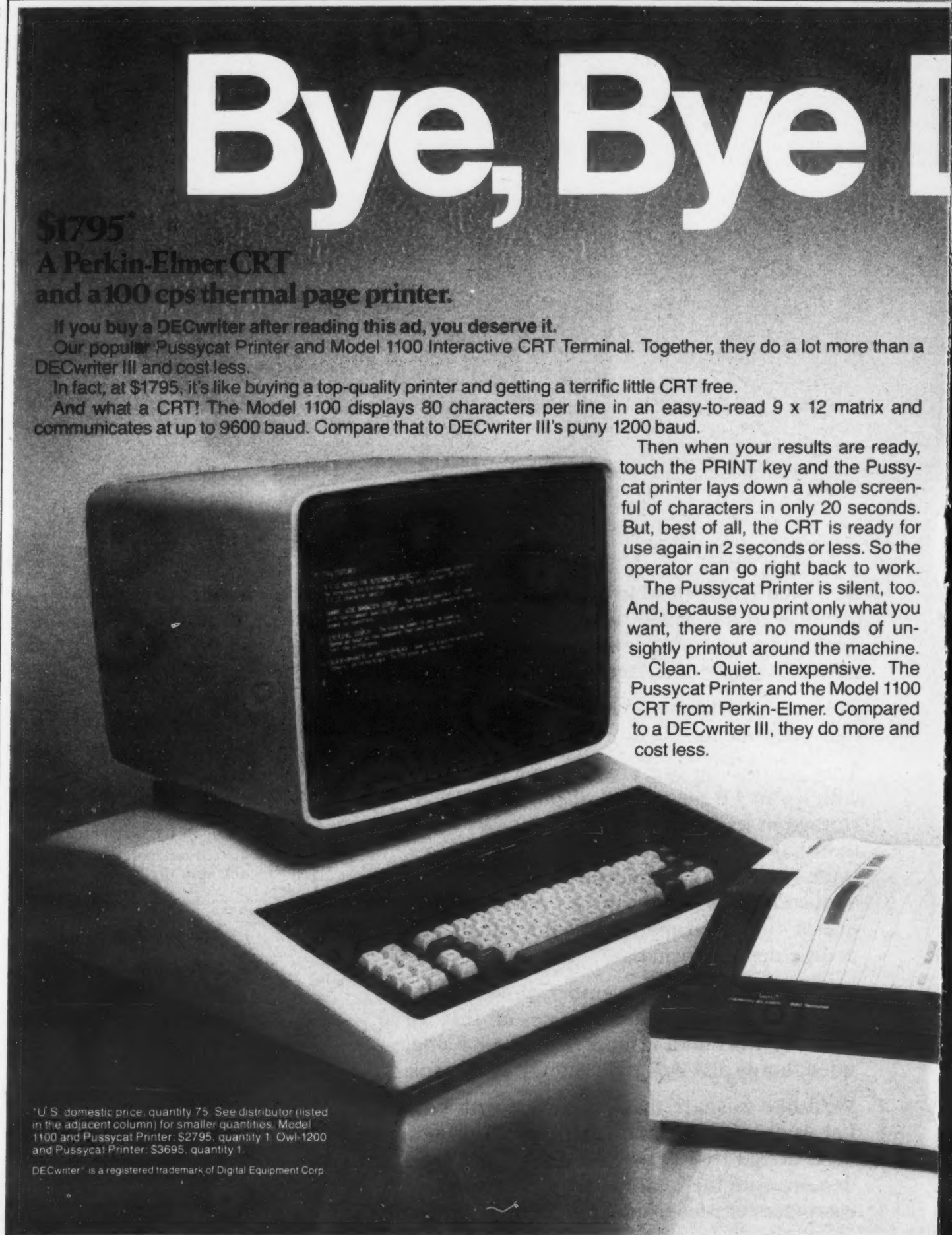
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Calendar

Oct. 3, New York — AT&T's ACS and IBM's PCM Mainframe Competition, sponsored by Oppenheimer & Co. Contact: W.J. McCaffery, One New York Plaza, New York, N.Y. 10004. Also being held Oct. 4 in Chicago and Oct. 5 in San Francisco.

Oct. 24-27, Hollywood, Fla. — American Production and Inventory Control Society, Inc. (Apics) 21st Annual Conference and Technical Exhibit. Contact: Apics, Suite 504, Watergate Building, 2600 Virginia Ave. N.W., Washington, D.C. 20037.

Oct. 24-27, Copenhagen, Denmark — Copenhagen Conference on Computer Impact, sponsored by Ifip Applied Information Processing Group. Contact: CCI-78, Diag, Danish EDP Council, 58 Bredgade, DK 1260 Copenhagen K, Denmark.

Oct. 25-27, San Francisco — Word Processing Guidelines for Planning, Design and Implementation, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 25-27, New York — Minicomputers and Distributed Processing sponsored by the University of Chicago. Contact: University of Chicago, Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

Oct. 25-27, Chicago — International Computer Retailers' Conference, sponsored by Management Research Associates. Contact: Management Research Associates, 60 E. 42nd St., New York, N.Y. 10017.

Oct. 30-31, Washington, D.C. — Managing Data as a Resource, sponsored by Data Resource Management

Associates. Contact: Arnold Barnett, Data Resources Management Associates, 19 Orchard Way North, Rockville, Md. 20854.

Oct. 29-Nov. 1, New Orleans — New Orleans '78, International Data Processing Conference and Business Exposition, sponsored by the Data Processing Management Association (DPMA). Contact: Conference Coordinator, DPMA, International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

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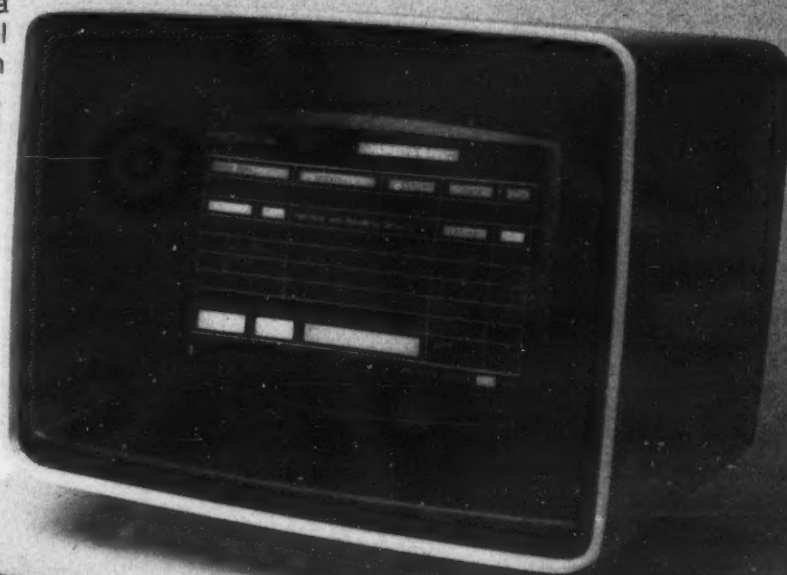
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Data Systems

Editorial Outclassed at Spin

The U.S. delegation to the Intergovernmental Conference on Strategies and Policies in Informatics (Spin) did little to advance this country's cause among the Third World nations that were well represented at the 10-day conference in Torremolinos, Spain, this month — and may actually have hurt the U.S. image.

Even though the conference [CW, Sept. 4, 11] was in the planning stages for four years, the U.S. delegation opened its formal presentation by declaring that the U.S. did not entirely welcome the conference "at this time."

Then, in a note several Third World Delegations took as "insulting and patronizing," John Fobes, who headed the U.S. group, added that "we were not sure that governments or at least enough officials of their services would be sufficiently well prepared to come to terms" with the items on the agenda.

But many of the Third World countries had spent a great amount of effort preparing for the meeting — attending four meetings sponsored by the Intergovernmental Bureau for Informatics (IBI) over the past few years and, in some cases, holding regional planning meetings.

"Apparently the only major delegation that is not prepared is that of the U.S., not the countries of the Third World," one Arab delegate said.

The makeup of the U.S. contingent also came under fire. Except for Gerald Schmitz, president of the National Association of State Information Systems (Nasis), it contained no technical people — and many of the Third World delegates were hungry for some exchanges on a practical, technical level. The rest of the U.S. delegation was made up of mid-level bureaucrats from the

State Department and the National Technical Information Service.

And even the choice of Fobes was more political than anything else. Fobes, while presently a professor at Duke University and therefore not a high-level government official, was apparently chosen because he was once deputy director general of the United Nations Educational, Scientific and Cultural Organization (Unesco), which sponsored the conference along with the IBI.

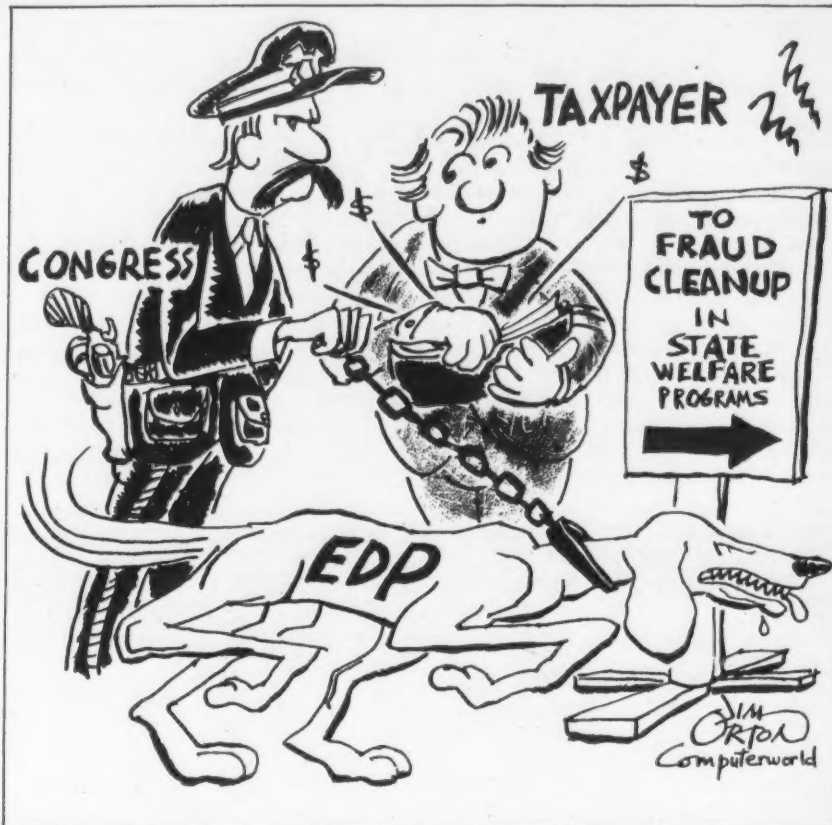
Furthermore, many Third World countries believed the *raison d'être* for the U.S. effort was to get them to blunt their criticisms of the multinational corporations — corporations which, in the computing field, are almost exclusively American and of which IBM received the major criticism.

"Instead of trying to offer aid that can be used by the developing countries, the U.S. seems more interested in defending IBM," one delegate at the conference said.

The U.S., of course, had some reasons for its low-key approach. For one, the IBI is not really a major UN organization, and some of the infighting between it and Unesco did slow the publication of documents and made the conference's organization a relative shambles.

However, many Third World countries — the nations of Africa, Latin America and the Arab bloc — are members of IBI, and many of them are investing time and effort in trying to make IBI work.

Now, however, they have been left feeling the U.S. doesn't care about their problems or aspirations. If the U.S. continues to ignore such gatherings, it may find itself shut out from a position of influence among the computer users of the developing nations.



Letters to the Editor

Wise Consolidation?

Regarding the General Accounting Office's (GAO) recommendation to consolidate 21 (probably large) DP facilities into eight (probably super) DP facilities [CW, Aug. 21], may I offer Burkard's law:

Twenty-one DP facilities serving a constituency can do a better job than eight.

At the same time, I must admit I am a person who can't believe that an SST really lifts off the ground. So Burkard's Law must contain a fallacy somewhere.

But be careful not to build a monster, guys! SSTs are not the only way to fly.

Stephen Burkard
Glen Burnie, Md.

Go Live With Beavers

Alex Nesenjuk must be a very sad man [CW, Aug. 14]. It's terrible that birds must resort to the use of computer paper for nesting material, when only 30 years ago, I remember seeing a bird who enjoyed the luxury of newsprint and scraps of clothing. See what the wicked computer has done!

Why, to "naturalists" like Nesenjuk, is a beaver dam a natural creation, while a dam built by man is a desecration of nature? If these people don't like man's use of his resources, perhaps they should give up their high-priced jobs which are created by perverted human progress (computers — ugh!) and go live with the beavers.

R.B. Gilmore
Kettering, Ohio

Joint Staffing at DODCI

The very kind words about the Department of Defense Computer Institute (DODCI) in the Aug. 14 editorial are appreciated.

While it is correct that the Navy administers DODCI, it should be

pointed out that DODCI is jointly staffed. In addition to the fine civilian instructor staff, officers of the Army, Navy, Air Force, Marine Corps and a British Royal Navy exchange officer serve on the faculty, bringing to DODCI a wide diversity of background.

The institute is also generously assisted by distinguished guest lecturers from private industry who share their thoughts and experiences about DP management. Many of these guest lecturers were brought to DODCI by Capt. Grace M. Hopper, a staunch supporter of DODCI, and a regular lecturer.

While the Navy is proud of its association with DODCI, the contributions of all must be acknowledged.

Capt. R.G. Hollenbach
U.S. Navy
Director

Department of Defense
Computer Institute
Washington, D.C.

Overactive Imagination

Naughty, naughty. "Microcode Boosts Performance" maybe, but "Microcode Boosts Throughput" goes too far [CW, Aug. 14].

I thought it was pretty well agreed that throughput relates to overall system performance, usually on a typical workload of some sort. But the article provided information on changes in execution times of some popular operations, not on the effect on overall performance.

In addition, by definition, throughput is a rate, not a time. That is, SQRT throughput should be stated in something like SQRTs per second.

In any case, I cannot find anything in the article that claims throughput improvements or even applies that term. Overimaginative caption writing, perhaps?

Dennis E. Hamilton
Penfield, N.Y.

Data Past

Five Years Ago Sept. 19, 1973

STOCKHOLM, Sweden — The world's first national law covering the operation of data banks containing personal information went into effect here with the appointment of Claes-Goran Kallner as the first chairman and director-general of the Swedish Data Inspection Board.

Eight Years Ago Sept. 23, 1970

MARLBORO, Mass. — RCA Corp. announced a family of computers in a self-proclaimed attempt to woo small-to-medium-scale users away from IBM. Called the RCA 2, 3, 6 and 7, the systems were intended as upgrades for the RCA Spectra/70 series and the IBM 360/30, 40 and 50.

FORT WAYNE, Ind. — Cynthia Crooks, 19, was found guilty of violating Indiana's trade secrets law by the attempted sale of a service bureau's programs to a client of the service bureau. Police charged Crooks obtained copies of the service bureau's programs for a brokerage firm. Her boyfriend, who worked as a computer operator for the service bureau, listed the programs on paper and took the printouts from the building, claiming he did not know of her plans. The boyfriend was not charged.

NEW YORK — A veteran of the House Special Subcommittee on the Invasions of Privacy warned that the federal government was well on its way to establishing a national data bank. Rep. Frank Horton (R-N.Y.), speaking before the Computer Audit Systems Symposium, said that despite congressional rejection of such a system, "Executive orders have been issued to upgrade the compatibility of various executive branch systems and thus all files held in the federal establishment will soon be able to be merged into a de facto National Data Bank."

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COMPUTERWORLD

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The Human Connection

Many Users Need Variety of System Sizes

By Jack Stone
Special to CW

I don't know how you spent your summer vacation, but I sure remember the fun and frolic I had writing about my recent experiences as a small business customer in the micro systems market. And as I began to prepare for this column, I sighed as I started to relegate these memories to history and turn my attention to the more serious matters of maxi systems.

But I had some difficulty making the transition. I was troubled by my conclusions that the two systems were so separable and that I was identifying the size of machine with the size of organization: micros for the little company and maxis for the big. (Of course, the micros to which I am referring are those suitable for production applications, include packaged hardware and software and are locally maintained.)

After reflecting on the needs of the individual user, I realized this correspondence was wrong and I was confusing systems needs with systems implementation.

The correct assessment is, of course, that regardless of the size of

the organization, users need and can justify access to a variety of machine systems. And the proper choice of machine should be based primarily on cost-effectiveness in processing a specified amount of data in the required time. The arbitrary conclusion of most large organizations that all processing must take place in central or regional facilities, or even local minis, is out of date when one takes into account the new microprocessing systems.

Consider, for example, the electrical engineer. Aren't there a large number of situations in which a broad class of problems can be solved economically with a 64K-byte-range micro and the balance with larger class machines? And doesn't this conclusion apply regardless of how big the company is?

And surely the insurance salesperson must have information systems needs that can best be met by combinations of micros and maxis: the micros to provide local administrative support and the maxis to enter and process applications and claims. Although the applications may vary, I would think machine services required for an indepen-

dent agent and a salaried employee are similar.

But if you want to quibble about these examples, let's turn to the use of micro systems for word processing. And let's think in terms of a 64K-class general-purpose machine with 1M-byte disks, plus terminal feature, for a ball-park purchase price today of \$10,000 and falling.

One way to justify such a machine is on the basis of improved quality and document turnaround, using existing staff. A much better way is through the elimination of part or all of a secretary's tasks by directly interfacing the person who originates the document to the machine. This is a dynamite application!

Believe me, it's only a matter of time before most professionals, regardless of their organizations' size, will be clamoring for their own word processor to eliminate errors and save quite a bit of time and a whole lot of money.

And when you toss into the word processor a general-purpose capability for local support and a terminal facility for access to remote mainframes, you've got a powerhouse in the hands of the user —

one that is going to move fast in the marketplace. I don't think I'm too optimistic to conclude that this type of microsystem will soon begin to rival the electric typewriter in its ubiquity.

As a matter of fact, aren't we now seeing a wild growth of micro systems in large organizations (under the guise of "intelligent terminals"? And aren't we witnessing unparalleled growth of the mainframe service bureau business derived from small customers who need such support on a limited basis?

In other words, it appears to me we are rapidly approaching an era (if we aren't already there) during which, for the first time, organizations regardless of size will recognize the need for, and see the availability of, a broad range of machine facilities to better match their needs and their pocketbook, starting from the micro terminal/stand-alone processor installed in the user's office and ending at remotely accessible large mainframe facilities.

Truly distributed information systems are here!

The Taylor Report

High Standards Expected For Independent Auditors

By Alan Taylor
Special to CW

Response to my recent articles on DP auditors [CW, July 10, 31, Aug. 7] has been varied, but the most argumentative response came from Robert P. Bigelow, editor of the Computer Law Service, a legal reporting service. Bigelow argued that when the cases reach the courts, as a practical matter, independent DP auditors will find themselves being measured by the highest published standards. Any lower standard set by certified public accountants or other computer users will not be acceptable.

It is surprising that these budding professionals, the DP auditors, will have to face up so quickly to such high standards. It took 50 years to formulate and enforce special standards for engineers, 500 years for lawyers and 5,000 years for doctors. Thus, it seems unfair to expect EDP auditors to adhere to the highest standards within the five-year life of the profession.

Currently, there are two groups of DP auditors — those working within the organization and those auditing outside it. Professionally, of course, there should be no difference between them. According to Bigelow, "From a practical viewpoint, you don't go after the \$20,000 equity a guy has in his house when he's one of your employees" — even though legally that person might be lia-

ble.

In effect, the liability comes down to the independent DP auditor who fails to properly audit a program, a department, a procurement or whatever. There are quite a few independent DP auditors. Some of them are involved in the management assistance departments of public accounting firms; others are freelancers.

Each year, these professionals are doing more valuable work. But as I talk to them, I find some feel they need not push themselves; it is enough to do a better job than the ordinary manager with an ax to grind.

Their argument is that most firms get more value from them than they pay for. But this reasoning can lead to the fallacy that it is very well to do an incomplete job if the pay is low.

If Bigelow is right — then the job has to be done properly, no matter how low the pay and no matter how time-consuming.

Two Arguments

Bigelow's two arguments are legally based. One is founded on a Massachusetts case in which a subsidiary specialist — an anesthesiologist who lived in New Bedford, a small city outside Boston — was held to the standards of Boston, "one of the medical centers of the nation, if not the world," according to the Massa-

(Continued on Page 28)

Reader Commentary

Certification Does Not Produce a Professional

By Charles R. Conner Jr.
Special to CW

In agreement with the article by Jeff D. Murphy, "Certification does not Create Professionals" [CW, Aug. 7], I wish to add some thoughts.

Having started in DP years ago as a tab operator and graduated through the ranks at various companies to my present position of senior on-line analyst, I've seen many sides of DP. I've seen systems that ran only by a programmer's daily massaging, and I've seen systems that were so poorly structured and overlaid you couldn't understand them but they functioned beautifully anyway.

I've seen installations that had little or no documentation, have little or no problems and act as models for other DP departments. I've seen installations with lots of documentation and standards take a week to fix a minor problem because of all the standards they had to follow, while the user was begging for his reports.

I get tired of being likened to a doctor or a lawyer. I am neither one. Most of the people I know in DP don't have degrees and aren't responsible for peoples' lives or freedom. Certification, as far as I'm concerned, is a way for someone to make money for a piece of paper no one but the elite or cliques of DP book writers and lecturers care about.

Professionalism is in the eye of the beholder. To a lawyer, a realtor could be a professional even though the realtor is a housewife who lists houses part-time. To a mechanic, a bricklayer could be a professional, and to a child, every adult could be a professional.

I believe anyone who works at something eight hours or so each day for five week days and gets paid for what he does is a professional. He develops a set of ethics, and if he hopes to keep his job, becomes competent and productive in what he does. His ethics evolve from his philosophy or from the psychological pressures of his immediate environment. This competence is directly related to his goals.

I never have believed and never will believe I'm in the same league as a doctor or lawyer. Although I hold a B.S. degree, I place myself above no one and below the people I rely upon for my health and well-being. Degrees in this field are of little use to the average analyst and of little or no use to the average programmer.

The bulk of good programmers and analysts I've known had a little technical or junior college background and the desire to be in DP. Their knowledge is experiential or gained by trial and error, not the result of earning doctorates and degrees in computer science. Certifying these

(Continued on Page 28)

Capitalizes on Incomplete Work 'Ragpicker' Finds Riches in Software Scraps

By Miles Benson

Special to CW

One of the strangest computing stories I can recall is the one I choose to call "The Ragpicker."

The Ragpicker — it was not his name, of course, but it describes him very well, as you will soon learn — works for General MPG, a leading auto company. And he capitalizes on two interesting computing phenomena to turn computing projects which might otherwise have failed into personal profit.

The phenomena on which he capi-

Sociology of Computing

talizes are:

- The vulnerability of research projects. For a variety of reasons, General MPG starts a lot of computing research projects which never get finished.

- The 90% completion syndrome. A lot of computing projects get to the 90% completion level. A lot fewer make it through the last 10%.

To be blunt, the Ragpicker scavenges on the software scrap heap of General MPG, looking for 90% complete programs. And when he finds a promising one, he takes it home, refurbishes it, finishes the last 10% — and sells it as his own.

You may be beginning to realize

that to call him the Ragpicker is both very apt and very misleading. It is apt because he is a poker through discards, looking at things no one else wants. It is misleading because the Ragpicker is getting rather rich at his picking. If you can imagine a Ragpicker wearing threads out of Hart, Schaffner and Klopfenstein, you have the right image.

Appropriate Story

We can talk about the abstract Ragpicker. But to really understand him and his modus operandi, it is necessary to tell a story. This one describes a software rag I'll call

XREF.

The Ragpicker first started picking software rags when he stumbled across a conversion casualty at General MPG called XREF. Now XREF was a generalized cross-reference lister program (A cross-reference lister identifies every place in a program; a variable is either set or used.) Given the right input, it could build a cross-reference list for a program written in any language.

It had been used experimentally to cross-reference programs written in Fortran, RPG and Cobol, but management had never been very excited about it, not understanding the value of a cross-reference listing to a maintenance programmer. When the time came to convert all of the old Marketratics 7910 software to the spanking new Marketratics 3PI, no one in General MPG thought to authorize conversion of XREF.

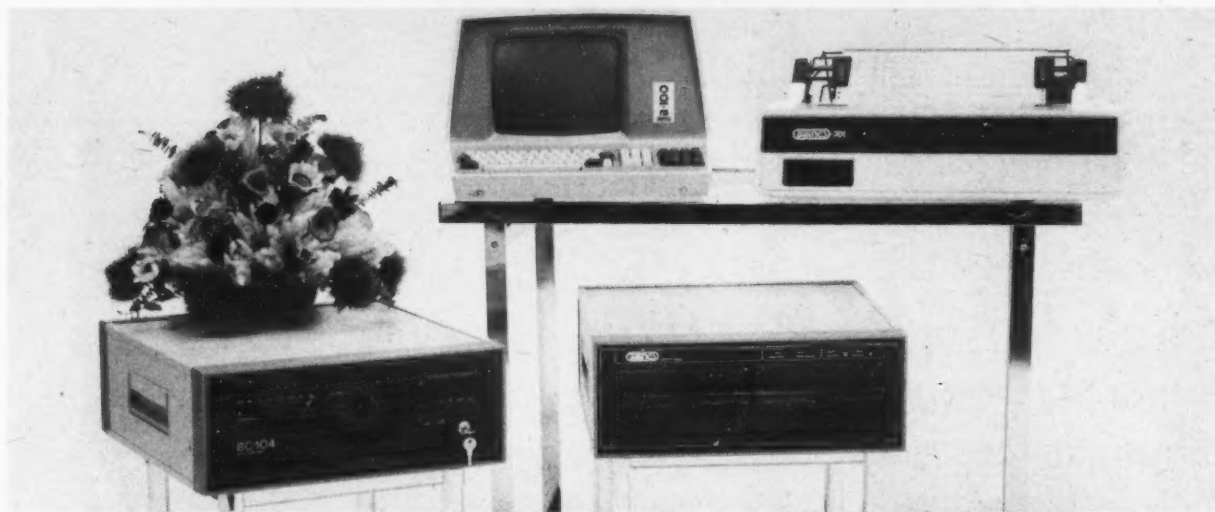
When the Ragpicker heard about that, he picked his first rag. He sorted through the surviving documentation, selecting out the listings, the user manual and the maintenance manual, and carefully made copies of them all and took them home. And then he set about doing his own XREF conversion. When he was through, he had a 3PI version of XREF and, barring the unlikely eventuality that anyone in General MPG would challenge his right to it, a marketable product.

Trying out some neophyte marketing skills, he contacted a set of 3PI installations and inquired about whether they would be interested in such a product and how much they would be willing to pay for it. The number of positive responses was, at first thought, discouragingly small. But when the Ragpicker considered that the small number of positive responses was 2% of the number he had contacted, and 2% of the enormous number of 3PI installations around the world was no longer a trivial number, he began to see that he had a carefully disguised rip-roaring success on his hands.

He drew up marketing brochures, broadsided the list of 3PI installations registered with the Marketratics users group, and before long a small but increasing stream of orders began turning up in the Ragpicker's mailbox.

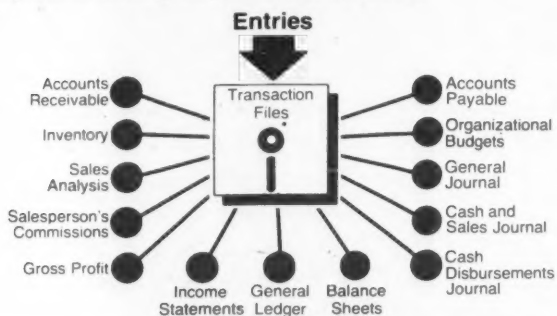
So what does a nouveau riche Ragpicker do when his software ship comes in — retire or become self-employed? "No, no, no," says the Ragpicker, a pragmatist to the end. He can't afford to stray that far from the General MPG software scrap heap!

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Highest Standards Expected of DP Auditors

(Continued from Page 25)
chusetts Supreme Judicial Court.

The defense vigorously argued the point and noted that previously doctors only had to comply with local standards.

In its ruling, the Supreme Judicial Court made a statement that auditors should consider carefully when they are urged to accept a job for low pay or without adequate time or resources.

Bigelow's other argument was that even if the courts did not officially demand that the DP auditor come up to top standards, the jury would take his specialized knowledge into account anyway.

According to Bigelow's arguments, the DP auditor is expected to be

more responsible than the average CPA. If one reads the rules CPAs are supposed to follow in any auditing assignment, he will see that being more responsible than that requires a good deal of work.

It is also the DP auditor's duty to make use of available resources. Bigelow included as resources the current work of the EDP Auditors Association, Edpacs (a publication sponsored by one of the audit societies), various conferences and so on.

As DP continues, these publications and conferences are being supplemented by data banks and processing banks. Within the next decade, we can expect the available resources to include special-

ized time-sharing checks to see whether the job was done properly — automatic supervision of the auditor's work by computerized computer experts.

The auditor will have to successfully pass these rigorous checks before he turns in his reports. And

that may take some doing.

But then, it may keep the profession relatively free from malpractice.

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Paper Doesn't Make Pros

(Continued from Page 25)
people for certification's sake is useless because it's meaningless and costly.

When you test someone for certification, how do you do it? On the basis of his language proficiency? If you don't test him, is he any less

competent? What if he doesn't and never will have aspirations for management positions? Is he any less or more professional?

A person who has passed parts of the test for certification isn't treated as if he were more competent or professional than someone who hasn't passed any.

I get tired of reading DP books spouting old concepts masquerading as new concepts, books that you can't understand unless you have a doctorate and books that tell you all kinds of theories, but no realities or specifics. But these authors are the same kind of people lobbying for professional certification in my chosen field. They've probably never had to deal with telephone calls from an irate user complaining that something was wrong.

Coner is a senior analyst with Johnson & Johnson Co. in Park Forest, Ill.

Now Another Way To Spell



Multiple Transient Support For All DOS/VS Systems



Relieves congestion resulting from single-thread use of the Logical Transient Area.



Relieves delays to on-line systems caused by the Logical Transient Area being occupied.



Relieves inhibited communications with POWER and other spooling systems which require the LTA.

CFSMTS Overview:

CFSMTS is a DOS/VS system enhancement which provides multiple Logical Transient Areas; one per partition and one for the Attention Routine. CFSMTS is release independent and supports systems with up to 15 partitions. CFSMTS will run on all DOS/VS systems including the S/370 115 through the 370/158, 3031, and S/360 or compatible machines.

Features:

Each problem program can concurrently execute code which requires use of the LTA (Logical Transient Area).

CFSMTS provides a dynamic classification facility to control the concurrent usage of \$SB transients which are dependent on a single resource.

The user may classify his own transients or any other transients at any time by executing the CFSMTS program and submitting appropriate parameters.

CFSMTS provides a statistical printout, on demand, showing any overlap that has been gained. These figures show an occurrence count and the elapsed time that 'n' transient areas were active concurrently. A summary of elapsed savings is also calculated both in terms of time saved and its percentage.

Supervisor Prerequisites:

CFSMTS requires an addition to the standard DOS/VS supervisor; however, this modification contains no executable code. This addition simply reserves space for the additional transient areas.

Hardware Requirements:

The CFSMTS program to activate the Multiple Transient Support requires either a virtual or a real partition of 32K in which to run. This program is executed only to activate Multiple Transient Support and to print the accumulated statistics.

CFSMTS is available from CFS, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for \$130.00, \$1,425.00 and \$4,275.00 respectively. All three lease plans include maintenance and support for as long as CFSMTS is installed.

Send requests for CFSMTS to CFS. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:



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1330 Boylston Street, Suite 608
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NBS' Berg to Chair Group

X3 Asks Help in Fresh Data Base Study

WASHINGTON, D.C. — In order to get a fresh look at the issues surrounding data base management methodologies, American National Standards X3 committee — through its Standards Planning and Requirements Committee (Sparc) — has authorized a study group to be convened later this month.

The effort will be chaired by John L. Berg, a computer scientist at the National Bureau of Standards, (NBS), who said he hopes the group he puts together and the work it does will be "a complete reset" and not a second version of a previous space study group.

The old group ended its work about a year ago with a report that was widely distributed but indecisive in its view of what should happen next. This was reflective of the membership of that group, which was split between proponents and opponents of the approach advocated by the Codasyl Data Base Task Group.

Berg hopes for a well-rounded group of implementors, vendors, users and academics, who will

presumably meet in plenary sessions two or three times a year, but do most of their work in small tasks groups meeting more frequently to pursue whatever subjects their chairmen, and the study group as a whole, feel are appropriate.

Mounting Pressure

The pressure for a resolution of the standardization question is mounting, Berg said, noting that an International Standards Organization (ISO) task group

on the subject is forming.

Closer to home, many of the technical committees within X3 — those working with Cobol and Fortran, for example — and the other Sparc study groups, such as one on distributed systems, are getting involved with data base concepts. They need a coherent and consistent foundation from which to work, Berg added.

Pointing to his own experience in chairing and participating in a number of committees, conferences and workshops, Berg said

he feels he is in a unique position to help bring together differing opinions and ensure a fair representation of all views.

The initial meeting will begin at 10 a.m. on Thursday, Sept. 28, at the offices of the Computer and Business Equipment Manufacturers Association, Suite 1200, 1828 L St. N.W., Washington, D.C. For planning purposes, Berg has asked that all interested parties contact him at NBS, Room A-265, Technology Building, Washington D.C. 20234.

Updated Cobol JOD Available

OTTAWA, Ont. — A freshly updated statement of the Cobol language as defined by the Codasyl Cobol Committee — the group charged with development of the language — as of the end of last December, the *Cobol 1978 Journal of Development (JOD)* has been published for Codasyl by the Canadian government.

The Cobol JOD has traditionally been utilized by the American National Standards X3J3

technical committee as the appropriate base from which to extract a subset acceptable to enough people to be sanctioned as the American National Standard (ANS) for the language.

Implementors have used the journal to determine what extensions they might include in compilers so the software goes beyond ANS specifications but remains in line with Codasyl's work.

In announcing publication of the JOD, the Codasyl spokesman highlighted the dynamic character of the language by pointing to 21 separate changes made since the previous version of the JOD, published in 1976.

These modifications range from the inclusion of a facility to specify symbolic characters and relate them positionally to the native character set or the user-defined alphabet to the inclusion of a facility to permit communications between constituent programs in a run unit.

The initial release of the Cobol 78 JOD also includes a facility to permit journalizing of data base operations and rollback to a prior state of data base integrity; the modification of specifications for data base key, record keys and realms; and the modification of current indicators for use in maintaining position during the update of a data base.

The JOD itself costs \$10 while a subscription service, providing page changes as the Codasyl group continues its work, costs an additional \$15 for 1978 or 1979, if ordered separately, or \$25 for both years.

Orders for the JOD, accompanied by payment in either U.S. or Canadian funds and made payable to the Receiver General of Canada, should be sent to the Department of Supply and Services, Material Data Management Centre, 4/B1 Place du Portage, Phase III, 11 Laurier St., Hull, Quebec, Canada K1A 0S5.

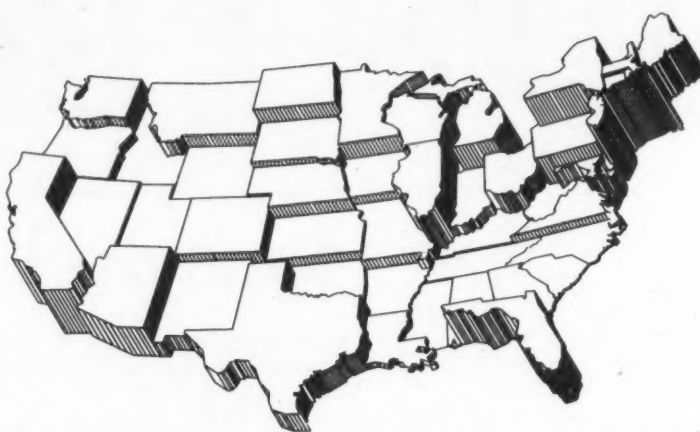
Map Programs, Data Bases Listed

CAMBRIDGE, Mass. — A catalog of computer-based map-making programs and publications is now available for \$1/copy from the Laboratory for Computer Graphics and Spatial Analysis at Harvard University.

Lab-Log, published in July, was described as a comprehensive guide to programs and publications related to computer cartography and geographic data bases. New programs include DOT, MAP, Odyssey and a version of Calform, a spokesman noted.

Publications added to this edition of the catalog include "Harvard Papers on Geographic Information Systems," Harvard Papers on Theoretical Cartography" and internal reports.

The 36-page booklet gives a brief introduction to the laboratory and its work and provides a 500-word synopsis and application notes on each program. Also described are currently available



The output of the Prism program written by Randolph Franklin while at Harvard, this map depicts immigrant population concentrations extracted from U.S. Census Bureau files. The work was run on a plotter driven by an IBM 370.

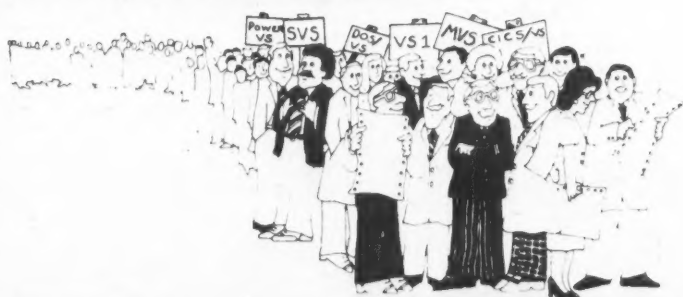
cartographic data bases such as the Urban Atlas Files and the U.S. Census Bureau "Dime" files.

Current prices of programs and

publications are included, the spokesman added.

The catalog can be ordered from the laboratory at 520 Gund Hall, Cambridge Mass. 02138.

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'Account-All' Puts 5110 In Business Environment

NEW YORK — Described as an operational system for the small system user, the Account-All collection of accounting modules from Think Solutions, Inc. was designed for stand-alone or integrated use on IBM's 5110 minicomputer.

Applications within the Account-All collection include general ledger, order processing with either pre- or postbilling, accounts receivable with either balance forward or open item accounting, inventory control, accounts payable with cash or accrual accounting, purchase order control, sales analysis and payroll.

Utilizing double-entry bookkeeping and audit trails, the ledger package produces — in addition to all needed reports — division, corporation or multicorporation income statements and balance sheets for a single period or in comparative form, according to a Think Solutions spokesman.

Both the prebilling and postbilling order processing systems produce a number of management reports in addition to the invoice set, the order quote, picking lists and the factory

purchase order set, he continued.

While the open item and balance forward accounts receivable packages provide different methods of applying payments and adjustments, both are said to be comprehensive systems with complete audit trails back to original source documents or journal entries.

Think Solutions' inventory control system supports on-line data entry and item file inquiry, showing inventory balance information.

The Think Solutions packages operate in a 32K-byte IBM 5110 environment. Most are available for \$1,750 each.

Think Solutions is at 310 E. 46th St., New York, N.Y. 10017.

QA Topic of Workshop

SAN DIEGO, Calif. — The San Diego Hilton Hotel will be the scene in mid-November of a software quality assurance workshop sponsored by the Los Angeles Chapter and two of the national special interest groups of the Association for Computing Machinery (ACM).

Keying on functional and practical issues, the Nov. 15-17 meeting will be concerned with both current experiences and developments in software QA, according to program chairman Clint Woodworth.

In this context, he noted, quality means meeting specifications and requirements in both operation and performance. Since quality cannot be "tested into" a software product after it has been completed, the ef-

fort to assure quality must surround the product throughout its development cycle, Woodworth said.

Presented papers will cover all aspects of software QA; one of the papers will be on a computing project that failed.

Other papers will include discussions of such topics as quality improvement programs, a requirements tracing tool, Nassi-Shneiderman charts and "acceptable software acceptance testing that goes beyond the book."

Advanced registration is \$60 for ACM members, \$80 for nonmembers and \$25 for students, according to workshop treasurer JoAnn Lockett, The Rand Corp., 1700 Main St., Santa Monica, Calif. 90406.

Manual Backs IMS Developer

OAK BROOK, Ill. — *The IMS/VS Application System Development Manual*, now available from Chicago Data Systems, Inc., provides a step-by-step structured approach to the development and implementation of applications to be run under IBM's Information Management System (IMS) software.

Using the design review concept, the manual shows the end user and the developer how to gather evidence to be sure the system being developed is, in fact, what the user needs. Checkpoints requiring user involvement are built into the procedure to ensure that design errors are corrected before they become expensive to repair, a vendor spokesman explained.

The book is aimed at the development of transaction processing systems, whether batch or on-line, because the VS implementation of IMS requires that orientation, he said.

The manual is said to ensure that structured methodologies are followed not only in the programming effort, but in all system development phases.

The manual is distributed in hard copy and on IBM "mag cards" to facilitate the insertion of in-house standards.

The manual costs \$9,500 and can be ordered from the vendor at 2805 Butterfield Road, Oak Brook, Ill. 60521.

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Computer Data Bases: The Future Is Tomorrow

By Stephen L. Robinson

Special to CW

An article entitled "Computer Data Bases: The Future Is Now" appeared in the *Harvard Business Review* about five years ago. Written by Richard Nolan, the article became an instant classic; I am told it has the highest reprint request of any article ever to appear in the review. It merited its reception.

Data Base Corner

Sometimes, however, I wonder what happened to all the people who requested the article. This wonder is created by the realization that the arti-

cle, had it not been printed until now, would probably be afforded the same reception as it received five years ago.

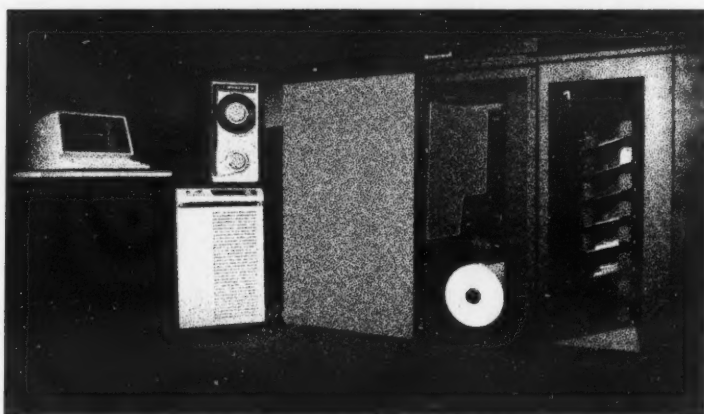
"Right on," the non-DP managers would say. They would underline key lines and route a copy to their DP managers. DP management would also say "Right on," then run out to attend seminars on data base.

The tone at most such seminars is conservative. "There is no cheap and dirty way to data base," "Top management commitment is essential," "First establish an office of data administration," ad nauseum.

Here our story follows several divergent paths dependent on the goals, aspirations and communication

		Non-Dp Management	
		Understands	Doesn't Understand
DP Management	Understands	Yea, Team!	May Be OK, But Trouble Likely
	Doesn't Understand	Conflict, But Trouble Unlikely	Disaster

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between DP and non-DP management. To do this most rationally, we shall differentiate between four combinations of the understanding (or lack thereof) between DP and non-DP management.

The accompanying figure depicts the four basic combinations possible and the likely outcomes of each.

The Disaster Situation

Somewhere along the line, DP managers get the idea that all they have to do to develop a data base system is acquire a data base package. Such a notion might come from misinterpreting a paper on data base, from an overzealous vendor of a data base package or from paying only half attention to a data base seminar. However the notion gets there, it is the start of another data base disaster.

A data base package is dutifully acquired, and DP management assures non-DP management data base activity is under way. Progress reports are made detailing the conversion of existing old-fashioned systems to modern data base systems.

What is happening, of course, is that READ and WRITE statements are being replaced by CALL statements. The data base package is being used as an access method. If management, DP and non-DP, understood what was going on, things might not be so bad.

Unfortunately, management is under the impression data base has finally arrived — until someone asks for information which requires the extraction of data from different functional areas. The mayhem that follows is omitted in deference to those with weak stomachs and to those who have seen it up close.

At the very least, several heads will roll. If DP management is really quick on its feet, it may convince non-DP management that the data base package is the source of all the problems.

The old data base package is dis-

(Continued on Page 32)

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False Hopes Prove Major Hazard

Understanding Key Factor in DBMS Success

(Continued from Page 31)

carded (often with a lot of public fanfare, by the vendor of the new data base package), and another data base package is acquired. If the DP manager is sharp enough to recognize the problem, he should also begin to update his resume at this point.

There are many installations which have jotted off data base failures as technical failures attributable to the shortcomings of a particular package. While some failures are a result of technical problems, most are organizational.

'May Be OK'

If DP management understands what

data base is all about but is unable to educate non-DP management, interesting situations can develop, depending on the authority, zeal and organizational capability of DP management.

The main problem with this combination is usually that non-DP management thinks "going data base" is merely a matter of acquiring a data base package, figuring out the JCL, loading the data and changing the application programs a bit. It also expects this activity to enable them to instantly access any and all data from any combination of data files.

Faced with the unpleasant prospect of dealing with such management, some DP managers, through guile and

deceit, develop data base systems unbeknownst to non-DP management.

I have seen data base groups formed, sub rosa, in a number of organizations. The titles of such groups reflect the imagination of the managers who created them: "MIS Study Group," "Policy and Procedure Review Committee," "Teleprocessing Study Team," "Software Advisory Committee."

Whatever the title, if the DP manager can gather the necessary resources to design a data base system and can successfully fend off the non-DP people who want to know why the "payroll data base" isn't up yet, then a successful data base project is feasible.

All too frequently, and understand-

ably, DP managers take the easy way out. They reimplement old systems using a data base package as the access method. Often this is spiffed up by the addition of a few on-line facilities. The end result, however, is quite predictable.

Eventually, non-DP management will want information that truly requires a data base system, not just a data base package access method. This is when the old resume gets updated and the data base savvy DP manager looks for another home.

Conflict Situation

In the relatively rare situation where DP management is mired in the past and non-DP management understands the implications of data base, a conflict — usually of short duration — arises.

The reason the conflict is usually short-lived is simple: DP management is either replaced or shunted aside. In one classic encounter of this kind, I observed an old guard DP head slowly moved into early retirement.

The execution of this maneuver was quite classical. A group was formed to "oversee" all new applications; DP maintained control over all old systems and enhancements/changes to old systems. After the second successful new application, the group was given control over enhancements to old systems and conversions (really redesigns) to the newly acquired data base package.

Soon the empire of the old head of DP had shrunk to the running of the computer center, a role then infringed upon by the creation of a performance review group which reported to the controller, not to the DP head.

All of this was too much for the old guard DP head; he opted for early retirement, opening the way for a reorganization of DP.

This was a long drawn-out situation because of the influence the DP head had with many board members and the long years of service he had put in with the company. Where no such obstacles exist, action is likely to be quicker and neater.

'Yea Team' Time

At last, success. True, the road may not be a smooth one. The transition to a data base system is fraught with problems, organizational and technical.

However, if everyone involved understands the objectives and is willing to work steadily toward them, the rewards are there to be reaped.

Robinson is an independent consultant operating as S.L. Robinson & Associates, Morrisville, Pa.

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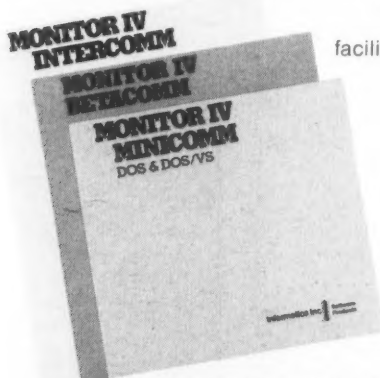
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"CICS is not all that bad. It is not, however, in INTERCOMM's class." (Emphasis added.)

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Independent Builds DBMS For Use on Prime Systems

PHOENIX — Described as an English command, data base query software package including a report/form writer, Prime/Power is available now from Database Systems Corp. for use on Prime Computer, Inc. 300s and larger systems.

An enhanced version, Prime/Power Plus, extends the basic package capabilities significantly but requires additional resources and runs only on the Prime 350 or larger CPUs, a spokesman noted.

Prime/Power is said to provide creation, retrieval and reporting support for index sequential (Prime's Midas), Ascii sequential, binary and direct access file structures. Pre-existing files generated by programs written in Fortran, Cobol or RPG-II are supported, he added.

More than 40 English-like verbs are available for use on a one-shot basis or stored as command procedures for subsequent execution.

The report/form writer facility allows users to generate ad hoc reports, sorted if need be on multiple fields, or to write to predefined forms. Security includes passwords on commands, or each file and at the field level on query.

The Power Plus extensions are said to include performance management ca-

pabilities intended to replace Prime's Forms software, a file relationships facility allowing the user to dynamically link as many as five separate files into a data base that is transparent to the user, and a text handling and editing function.

The text support allows 50 lines of text to be stored with each data record. This can be used to describe the record or for any other purpose the user envisions. The text can be scanned for key words previously marked by the user, the spokesman continued.

Prime/Power costs \$7,500 while the Power Plus version costs \$12,500, the vendor noted from 2202 E. Camelback Road, Phoenix, Ariz. 85016.

'Dr. D' Cures Disk Ills

ATLANTA — Installations with IBM DOS or DOS/VS environments have another utility to consider with the introduction of the Dump Restore from Disk (Dr. D) package from NCI, Inc.

The medical sound to the product's name is deliberate — and legitimate, a spokesman claimed — because the software "cures many of the disk organization problems that plague a lot of installations."

Dr. D supports the transfer of both data files and program libraries from disk to tape and back again. Said to be "considerably faster" than similar products, it will automatically reorganize Isam or Vsam files as they are rebuilt, the spokes-

man said.

The package will also condense core image and other IBM system libraries, as well as private program libraries, and rebuild them in new locations in different sizes, if desired. System libraries may be restored or copied as private libraries and vice versa, he noted.

Members may be selectively restored and merged with any degree of selectivity desired. There is even a reorganize feature for altering SYSRES allocations, just prior to restoring system libraries, he went on.

The package costs \$2,000 or \$108/mo from NCI, Inc., 6075 Roswell Road, Atlanta, Ga. 30328.

'Escort' Update Eases BC/7 Use

BLUE BELL, Pa. — The Escort language for use on Univac BC/7 small business systems has been enhanced so that it now provides a simpler method for creating CRT screen formats for data entry and report formats for output hard copy, a Univac spokeswoman said.

Escort is intended primarily for DP novices. It functions in either of two modes: tutorial, in which the system provides prompting to help the user express his needs and then creates the program for him; and "program" mode, in which the user creates his own logic through the system's command language.

Working from the system's workstation display and keyboard, users can create, change and store forms for both printers and CRTs, after which they are available for use by all application programs running on the BC/7, the spokeswoman explained.

The Escort update is also said to provide increased versatility in the definition of data files. Alphanumeric fields may be 256 characters long and there may be 255 fields in a record. Eight different record types may be in a file and support is included for 128 different ways to format files for data entry and retrieval, she continued.

Data manipulation is eased by options for sorting, clearing fields, multiple computing, output field modification and line counting, according to the spokeswoman. Records may be sorted on from one to six keys. Input fields may be blanked or zeroed before they are presented for output, she added.

Access to the current printer line number and a facility for paper skipping and spacing are also provided.

The language package costs \$1,920.

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Data Base/Practical Issues — Part 2

Disparate Groups of Data Can Be Organized

By Robert E. Roach
Special to CW

The first article in this three-part series discussed the pros and cons of organizing files in hierarchies and of organizing them in relational networks [CW, Sept. 11]. While efficiency trade-offs may favor the hierarchical approach, relational networks often result in a much more flexible and elegant design.

This article will address the question of how to organize disparate groupings of data into a well-conceived data base.

In any data processing application, there are basically two types of files. The first type I shall refer to as the utility file (UF). In his book *Principles of Data Base Management*, James Martin uses the term "subject file." The second type is the application reporting file (RF).

Utility files are all those little lookup tables that are such a bother to create and maintain. They are such things as a company's table of organization; a list of products, customers or parts; the chart of accounts; the roster of employees; and rates.

A utility file lends itself very nicely to the analogy of a public library. The UF is like a reference book. There are many books in a library and they are generally available to the public for their shared use.

The contents of a UF (or a reference book) are straightforward. They consist of a key or index and a description, a list of attributes or values.

For example, a table of organization would have an arbitrary organization code (or profit center/cost center code), the name of the organizational unit, the divisions to which it belongs and so forth. A parts file would have a part number, a descriptive title and indicative information related to it.

The viewpoint of the user is that he wants the job done, not some library of reference works maintained. In the library analogy, the applications are the questions which the citizens bring to the library. In order to answer them, they retrieve information from the reference volumes. Each question may be different, but the people can all share the same books.

How does this actually relate to applications? Applications may share

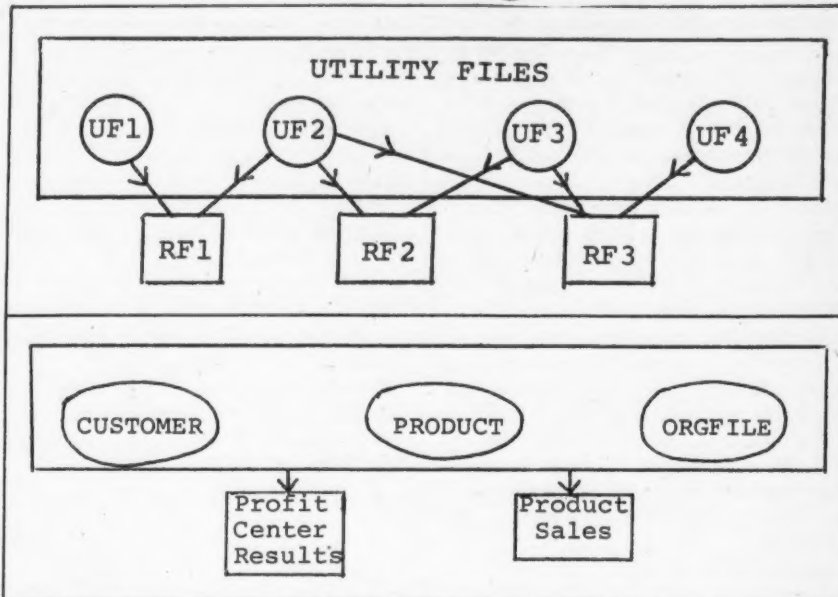


Figure 1 (top) shows a data base consisting of utility files and reporting files. All reports are produced from the RFs, which may access data in the UFs. In Figure 2 (bottom), the reporting files — profit center results and product sales — access and share UFs as needed.

UFs. This is a significant advantage because it means that a utility file needs to be maintained by only one process. As a result, it is always up-to-date or synchronized for all users.

Just as it is necessary for a library to keep only one set of reference works for its readers, an organizational entity or family of applications must maintain only one set of utility files.

In Figure 1, UFs are shown in the large box and are represented by circles.

As new UFs are needed, they are added to the data base. Then they are immediately available to all other applications.

The applications produce reports strictly through the application reporting files, shown in Figure 1 as small squares. The RFs access any or all of the UFs by means of file networking, which provides completely automatic retrieval of the UF.

(Continued on Page 47)

NEW Software Translators being developed at Dataware

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| <input type="checkbox"/> PLAN to COBOL | <input type="checkbox"/> DIBOL to COBOL |
| <input type="checkbox"/> BASIC to COBOL | <input type="checkbox"/> 7080 AUTOCODER to COBOL |
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PDP-11 Used for Business With UK-Developed 'Finar'

NEW YORK — The Financial Analysis and Reporting (Finar) language, designed to give users of Digital Equipment Corp. PDP-11s a planning facil-

ity, is now available from Finar Systems Ltd., the U.S. arm of the British software firm that developed the package.

With Finar, senior managers with no DP experience can create their own financial plans, budget, forecasts and business plans using familiar accounting terms in English, a spokesman said.

In addition to report and graph formatting capabilities, this financial modeling package enables the user to pose and answer "what if" questions. It also offers sensitivity analysis, statistical forecasting, discounted cash flow functions and a "large selection of calculations commonly used in business planning," the spokesman continued.

Finar is available in both Basic-Plus and Basic-Plus 2. The software is interactive in its support of the DP-naive user, offering warning messages when an error is made and suggestions of how the error can be corrected, he said.

Experienced analysts can make use of abbreviated command sequences as well as regression analysis, virtual models, conditional logic, reverse iteration, hierarchical data structures and an interface with other files and programs on the PDP-11, according to the spokesman.

Finar costs \$15,000 plus maintenance or \$750/mo, the spokesman said from No. 13H, 280 Riverside Drive, New York, N.Y. 10025.

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It will only cost you a little time and fifteen cents to outline your package and its areas of use to us. And, it could pay you big dividends once we get together.

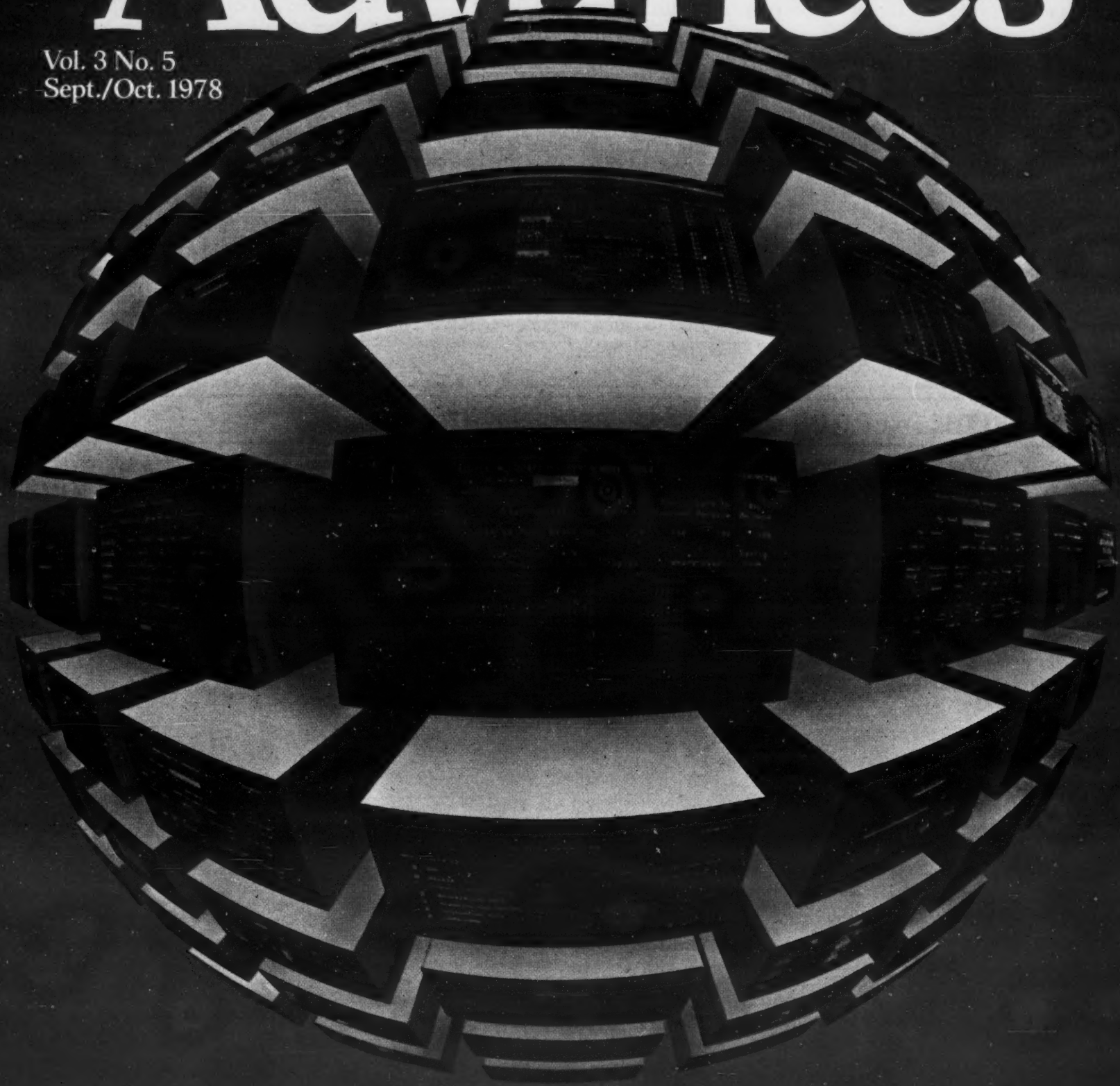
Drop us a note today and we'll get back to you immediately to see if there's a way we can both benefit from your expertise.



Box 1620
Computerworld
797 Washington Street
Newton, Mass. 02160

Hewlett-Packard Computer Advances

Vol. 3 No. 5
Sept./Oct. 1978



The HP 3000 Series III expands the world of transaction processing
Data base management on a \$24,500 computer—the HP 250

The HP 3000 Series III: more transactions, more data, more memory, more software...

Companies are placing computers out where the action is—into the hands of the people who are closest to and most familiar with the company's data—for example, employees in order processing, shipping, accounting, and manufacturing. These people enter the data to update the data base or initiate other processing and within

seconds receive a confirmation or response which completes the transaction. Instantly, that same current data can be available to authorized persons throughout the company, even those at remote locations. This is on-line transaction processing and represents what the majority of 1500 HP3000 systems installed in business and

industry are doing. Now, with the introduction of the more powerful HP3000 Series III, our systems perform even better in this demanding environment.

Fast response time

People engrossed in their work don't want to wait for a computer response. Yet when many people are all competing for the same system resources, as in a transaction processing environment, response time and throughput may suffer. To avoid this problem, the new

There are immediate answers for everyone with the new HP3000 Series III on-line transaction processing system. When multiple users share common programs and data bases—essential company business decisions can be made on the spot. Despite continuous change, valuable data is always kept current.

ONE SECOND IN THE WORLD OF TRANSACTION PROCESSING

Order Entry

An order entry clerk enters the customer's name. Address and credit status are displayed. Upon entry of the order (part numbers and quantities), availability, ship date, and price are displayed instantly, enabling prompt and accurate filling of customer orders.

Cost Accounting Update

A cost accountant accesses and shares purchasing and manufacturing data to keep standard costs up-to-date. These costs, revised in a matter of seconds, allow tight control over product prices and manufacturing expenses.

Inventory Retrieval

A manufacturing supervisor needs inventory status of several parts. Part numbers are typed in and on-hand quantity, outstanding orders, and date due in-house are displayed immediately. She can schedule production line work effectively, based on present inventory and future part orders.

Shipping Retrieval

A shipping clerk filling orders enters a customer order number on his terminal. An address label and packing list noting those items included in the shipment and those backordered are immediately printed — enabling quick, accurate order shipment.



HP3000 Series III was specifically designed for high performance in a transaction processing environment.

For example, the operating system, MPE III dynamically allocates system resources such as memory, processing time and peripheral devices to ensure low response time and high throughput in an on-line transaction processing environment. With advances such as multi-use interactive processing, and multiple languages (BASIC, COBOL, FORTRAN, RPG, and SPL), MPE facilitates transaction

processing without a special monitor.

Increased memory

By increasing our internal memory capacity to 2 megabytes, we have minimized time consuming disc swaps, and greatly improved performance.

Board density, four times that of our earlier version, was achieved by packing new 16K RAM semiconductor memory onto 256K boards—each with error correction. At \$32,000 a megabyte, the

Series III memory is 46% less expensive than its predecessor and leads the industry in memory pricing.

We further increased performance by optimizing the HP3000 for a large number of terminals sharing the same programs and data base.

First, we analyzed the workings of our memory allocation manager and learned how to increase its efficiency.

Then, IMAGE, the data base management system of the HP3000, was enhanced to be more

Continued on page 4

Inventory Update

A materials receiving clerk processes incoming orders. The computer indicates what was ordered and those items received are entered into the data base. Order status and inventory are updated, giving up-to-the-minute accuracy.

Others

Sixteen other users are also accessing the system. Five order entry clerks are entering, updating, and cancelling orders. Order status is also being checked. Three buyers are viewing production schedules, determining part requirements, and purchasing parts. One materials receiving clerk is processing incoming orders, while one production control

supervisor is analyzing shipping targets. There are three accounting clerks working with accounts receivable, accounts payable, and payroll systems. And two programmers are developing and writing modifications: one to a financial forecasting program; the other to a new payroll program. A batch COBOL compile is also being printed.



...less time, less money

HP3000 Series III, continued

transaction oriented. By changing to an internal buffering scheme, we can pool or share user data base control information. This reduces both disc access and memory overhead and results in a 30% increase in the number of users while response time remains the same.

Further, to guide our customers in selecting the exact configuration to handle their transaction load, we conducted a series of realistic application tests. We varied the environments and measured the performance of the Series III. The data we collected is available upon request. See the reply card.

VIEW/3000 software

VIEW/3000 plays two major roles. First, it is a stand-alone source data entry package. Data entry applications can be designed with no programming effort. Within minutes, users can begin entering data on-line. Second, as a front-end

to transaction processing application programs, VIEW/3000 augments programmer productivity.

VIEW/3000 provides the first step in the data entry process, forms design, without any programming effort at all. A form can be "painted" or drawn on the screen, and standard edit specifications chosen from a menu. VIEW/3000 also provides source data entry and validation for application designers again without writing a program.

More sophisticated data entry needs can also be satisfied with VIEW/3000. The VIEW design language provides complete field and form processing; advanced data editing, data movement, data formatting, and conditionals (if... then...else). In addition, full arithmetic capability is provided.

Finally, VIEW/3000 provides an extensive set of high-level terminal and data handling routines ("GETNEXTFORM" for example) callable from BASIC, COBOL,

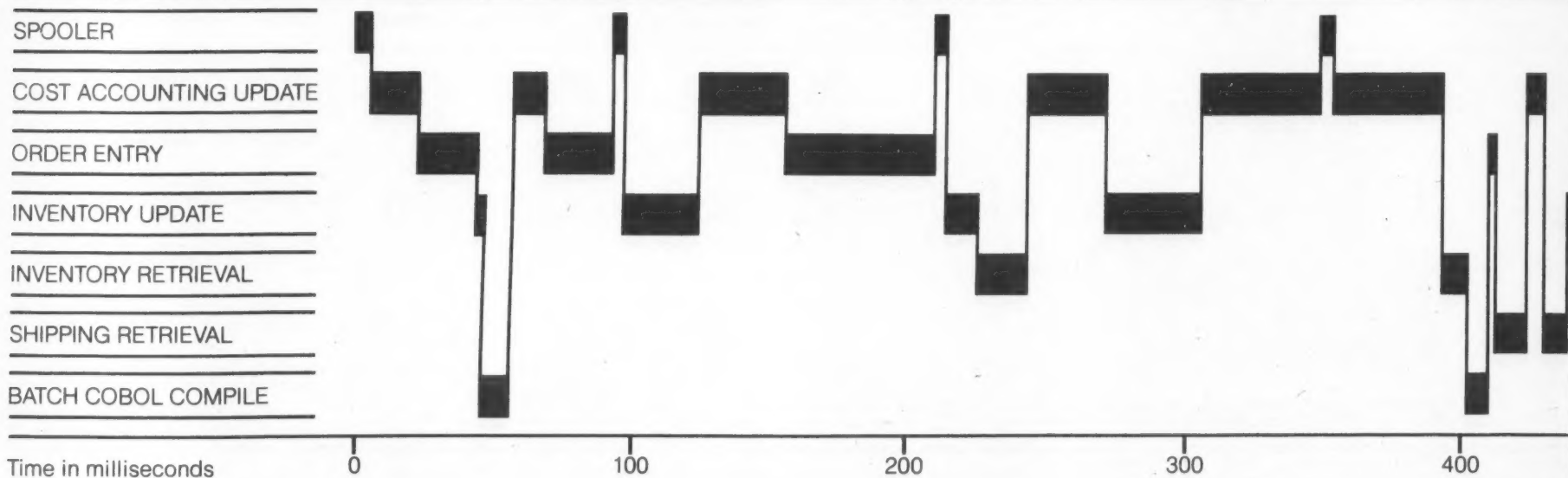
MAIN MEMORY: \$32,000 PER MB

FORTRAN, RPG, and SPL. These provide a simple interface between a transaction processing application program, the forms created by VIEW and an HP2640 family terminal.

Easy user interface

Imagine a data entry clerk able to log on to the system and immediately begin entering data. The system designer assigns a name to a sequence of MPE commands that accomplish a given task. Whenever that name is referenced, the

ONE SECOND IN THE LIFE OF AN HP3000 SERIES III



sequence is automatically executed.

To further conceal system commands from the user, the HELP facility which normally provides an on-line description of MPE commands, can be tailored to fit your application. You can display customized command descriptions. Similarly, you can tailor the system error messages to have more pertinent meaning to your users.

Large data bases

In a typical transaction processing application, data bases tend to be large. HP has significantly increased its on-line storage with the introduction of the HP7925. The Series III now supports up to eight HP7925 disc drives for a total capacity of 960 megabytes.

In a highly changeable environment, a fast and accurate method for system backup and recovery must assure data integrity. With HP's serial disc interface that backup is to a disc pack. Plus private

volume disc packs can be copied directly in a matter of minutes.

Never re-enter data

All data transactions that change the character of the data base are automatically logged by IMAGE. This includes a recovery program which restores transactions to the data base and eliminates the need to re-enter data in the event of a system failure. In addition, for MPE and KSAM files, you can set up your own logging records and establish an audit trail.

Sometimes it is essential for one user to have exclusive control of certain parts of the data base. IMAGE's associative locking provides a three-tiered, high-speed

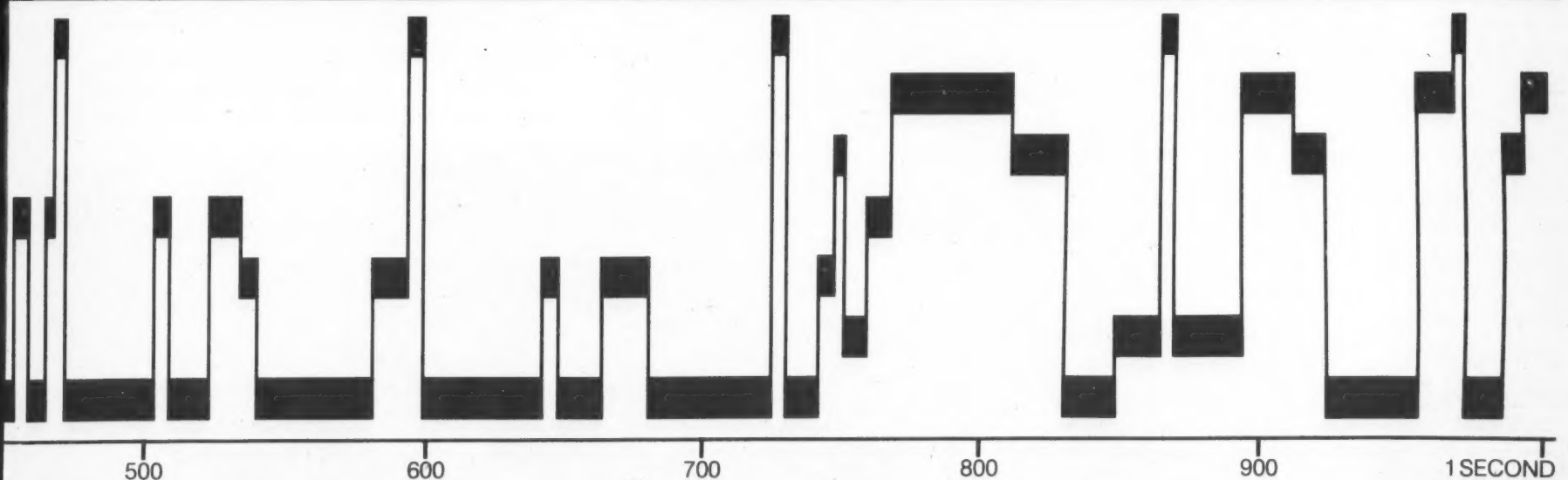
locking scheme to accomplish this. Locking can occur for the entire data base, for one or more sets, or for one or more entries in a named data set—or for any combination of the three. Data is locked, not by record number, but by specifying the data contents. For example, "LOCK FLIGHT FILE WHERE FLNO = 92 AND LOCK PASSENGER FILE WHERE NAME = JONES" locks only those portions of the files, leaving the rest fully accessible to other users.

The HP3000 Series III base price is \$115,000*.

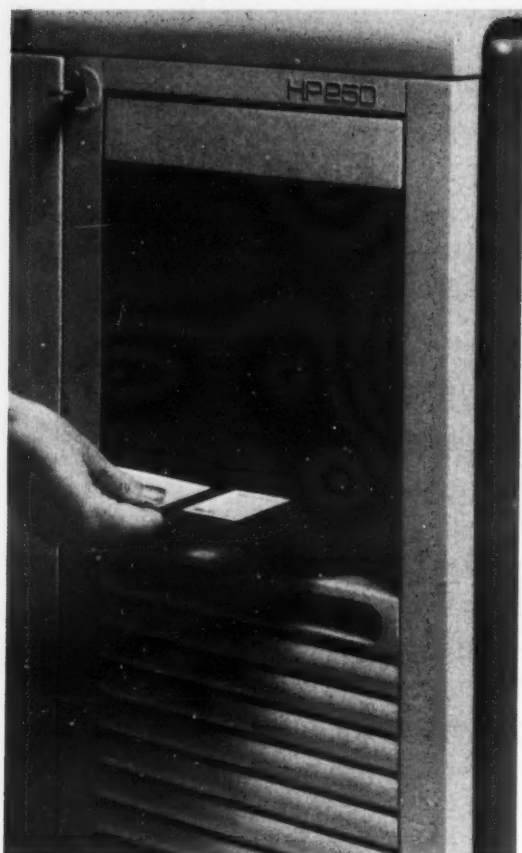
For more information, or for the Performance Guide, indicate A to C on the reply card.

*U.S. domestic prices only.

To illustrate what efficient system resource switching is needed to satisfy the demands of transaction processing, we tracked the Series III operating system, MPE, for just one second. Twenty users were doing simultaneous batch processing, on-line program development, and interactive data entry and inquiry to a data base. MPE III determined that six users needed CPU attention. Performance was high—2638 transactions occurred each hour, and response time averaged three seconds.



The HP 250: Easy to work at



The new HP250 computer system offers a rare and useful combination of product design and software. Human engineered to reflect the way people like to work, and with software tools to facilitate user interaction and increase programmer productivity, the HP250 is a computer system for small companies or departments of larger companies.

A major breakthrough of the HP250 is the combination of true data base management and extensive software tools for report and forms generation—all for under \$25,000*.

The HP250 hardware is a state-of-the-art 16 bit N Channel MOS microprocessor which handles computation with 12 digit accuracy. Up to three flexible disc drives of 1.2 formatted megabytes each pro-

vide expanded storage. The entire operating system is loaded from flexible disc into its own internal memory space. Thus, it is always on-line, ready for instant use.

Ergonomic design

Well before the design drawings of the HP250 were done, we took the time to observe people entering customer orders at a terminal.

Nobody did the job the same way. Some individuals moved the customer reference books from left to right, as well as the source document and, interestingly enough, even the CRT display screen. Everyone had their own approach to positioning the elements, and their own preferred position for entering data at the keyboard.

To accommodate this wide range of preferences, several design conclusions

were reached. First, the desk area must provide users with ample space in which to arrange their paperwork. Second, all key elements should be within arm's reach. And third, the CRT must move.

Slide, swivel, and tilt

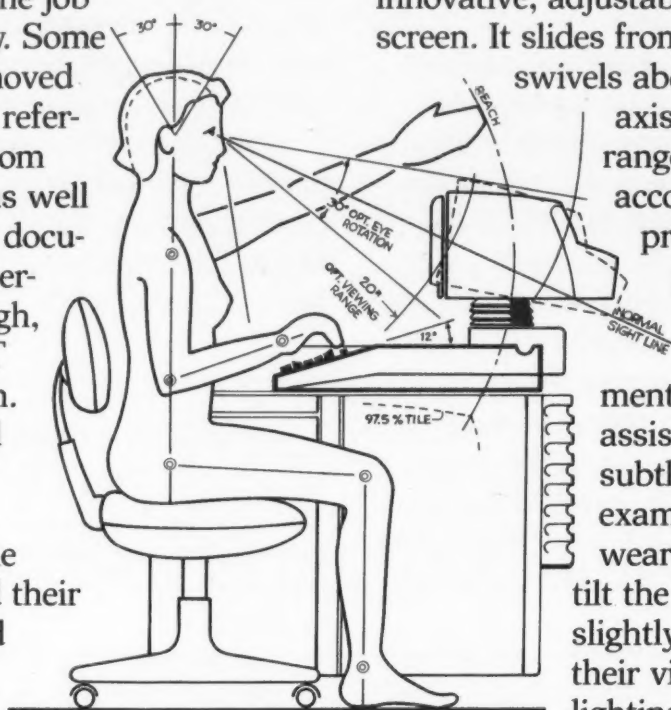
Perhaps the most singular expression of the HP250's commitment to human engineering is in its innovative, adjustable display screen. It slides from side to side,

swivels about a vertical axis, and tilts. This range of adjustment accommodates all preferences for positioning the screen.

The movements are wide, but assist comfort in subtle ways. For example, people wearing bi-focals can tilt the screen ever so slightly to facilitate their viewing. Where lighting variations

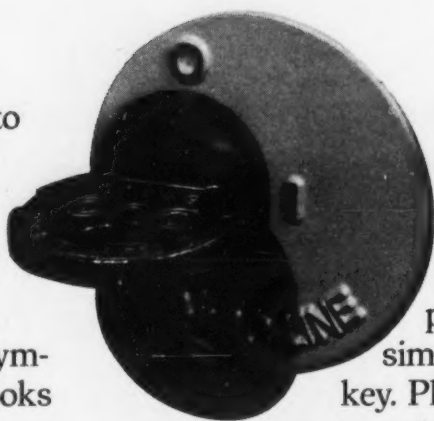
necessitate slight angling to reduce distracting glare, the HP250 adjusts.

Key in the development



of the HP250 was the desire to simplify its design and use to accommodate an operator's unfamiliarity with computers. It was essential, we believed, not to intimidate users with a complex array of confusing, symbolic keys. So the keyboard looks and acts like a typewriter.

The keyboard's height, slope, and innovative contour optimally encourage "homing" in on keys. The keyboard

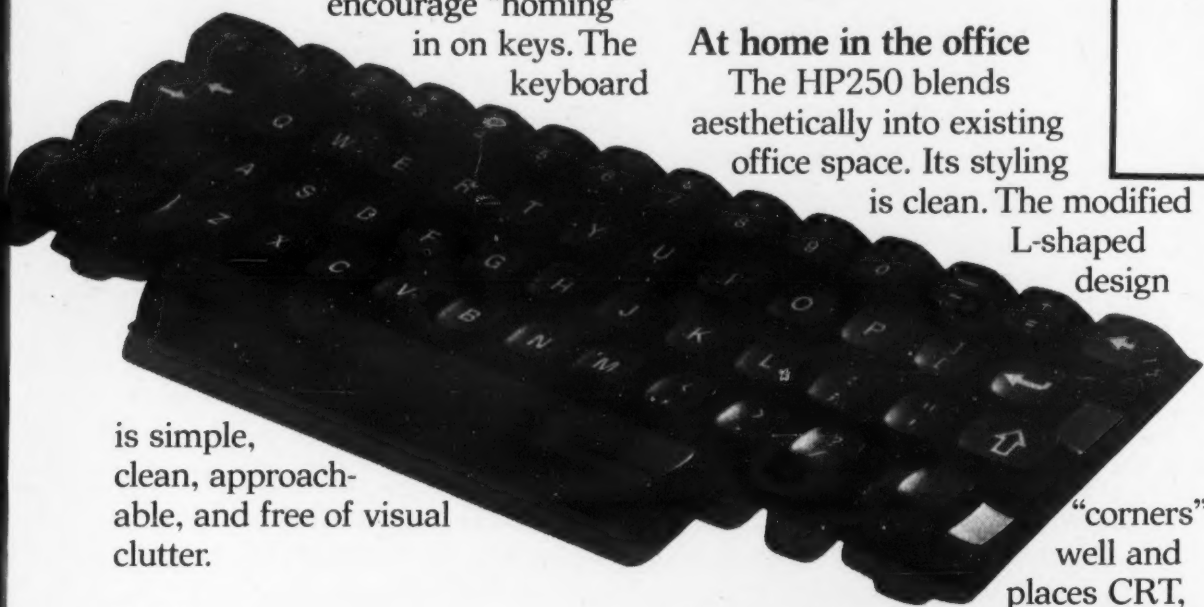


Easy on, easy off

The on-off switch reduces power-on procedures to a simple turn of a key. Plus, at turn-on, an automatic self-test assures you that everything is working.

At home in the office

The HP250 blends aesthetically into existing office space. Its styling is clean. The modified L-shaped design

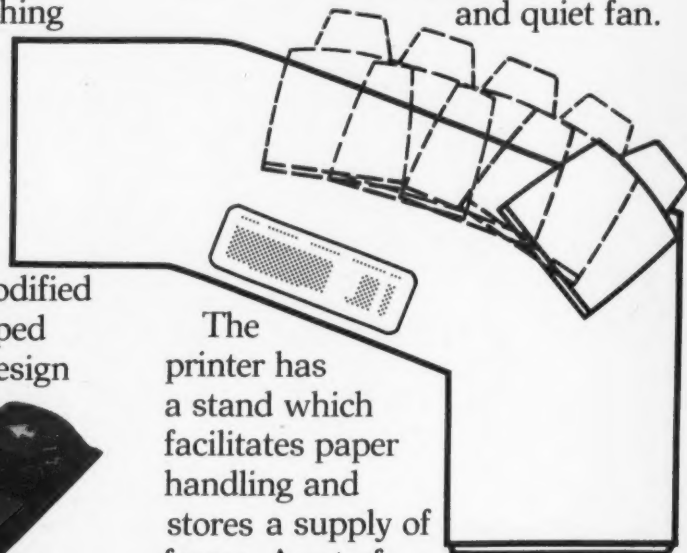


is simple, clean, approachable, and free of visual clutter.

Softkeys

Eight "softkeys," or special user defined function keys, are located along the bottom edge of the display screen and provide an innovative means for easy operation. A displayed message above each softkey describes its present function. Pressing this key begins an operation. Upon completion, the program branches automatically to the next step in the routine and new softkey definitions appear. This approach steps relatively untrained operators effortlessly through several layers of complicated procedures and reduces the possibility of their inputting errors.

reach. Accent panels, available in several colors, help coordinate the HP250 to the office decor. A concern for noise reduction led to an efficient multiple-fan approach for cooling. All the heat producing elements were separated into three different heat compartments, each with its own low-volume and quiet fan.



The printer has a stand which facilitates paper handling and stores a supply of forms. A set of quick reference cards in the console drawer capsulizes key instructions. Also, the HP250 can easily be rolled wheelbarrow fashion.

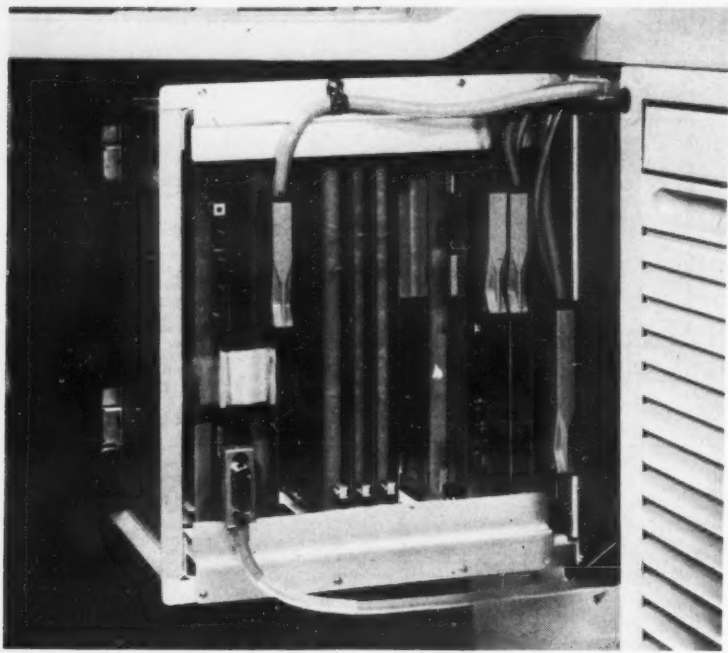
keyboard, and disc within easy



The HP 250: Easy to work on

Service with dignity

Our service engineers can repair your HP250 wearing their suits. A menu driven, hierarchical, self-test speedily isolates problems to a board level. The entire card cage rolls out from the front. Repair



is then as simple and clean as a board exchange. The self-test is a diagnostic tool, not a go/no-go approach. In fact, a 16 position indicator helps service engineers track intermittent problems.

Business BASIC

The HP250 represents a high standard of human engineering. This, in combination with high-level software results in a powerful, yet simple to use programming system.

The HP250's programming language is an enhanced business version of HP BASIC. It has subprograms, string manipulations, and multi-dimensional (6) arrays (numeric and string). It includes commands for mass memory control, print formatting, softkey

control and CRT formatting.

The capability to name variables using up to 15 characters makes programs more readable. The true subprogram capability provides local variables to the subprogram with parameter passing. This is a

powerful tool for writing general routines that can be used by any program.

Data base capability

Modeled after the award winning IMAGE/3000, IMAGE/250 is a collection of utilities and commands that create, control and maintain a complex information management system with full security. Sorting and finding across data sets is one

of its powerful capabilities.

IMAGE/250 has multi-volume data base capability. The user is not restricted to the on-line flexible disc capability. The data base can be organized into logical sub-sets. These different files, each on separate discs and rapidly loaded when needed, integrate to form a full data base. The operating system attends to over-head and provides checks such as locking the drive when a disc is being accessed. Plus, the HP7906 disc with 20 megabytes of storage is available to further accommodate growth.

QUERY/250 facilitates free form, authorized, unprogrammed access to this stored information. Its frequent prompts assist inexperienced users in retrieving, up-

dating or modifying data. No additional programs need to be written.

User forms on screen

With the programmer's tool FORMS/250, the paper forms that employees are familiar with can be easily recreated to appear on the CRT screen. A straight-forward, branching menu approach prompts you through the forms design process.

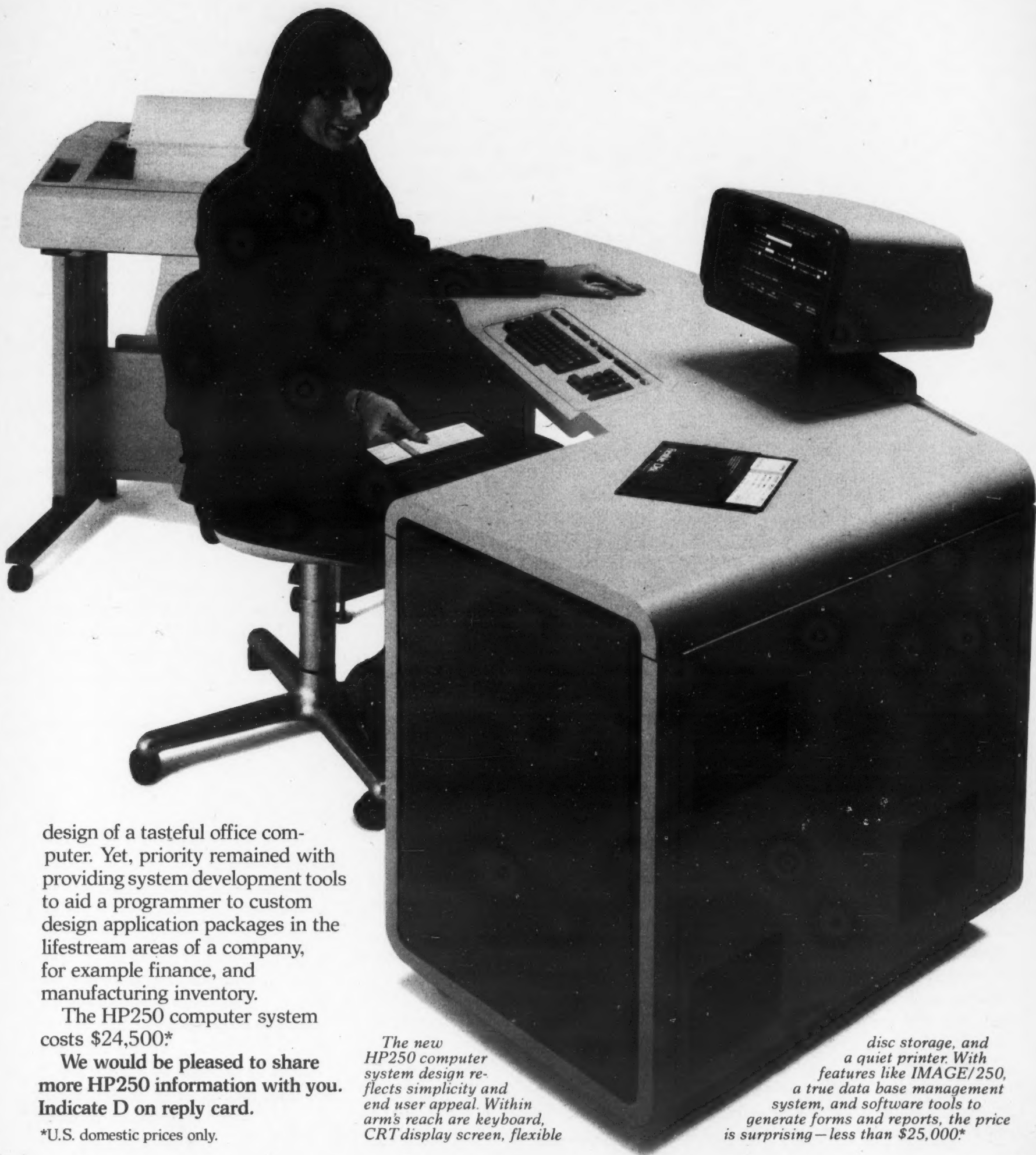
A full line drawing set enables careful matching to the paper form. Since the forms are treated as independent files, they can be modified or tailored later without affecting the BASIC program. Once a form is created, the user can display it on the screen, fill-in the blanks, and press a key to log the entire transaction. This technique speeds data entry and requires minimal operator training. Softkeys can also be assigned to execute a series of up to 160 key strokes. This typing aid short cut relieves programmers from re-entering frequently used phrases or sequences.

Create a report

Report WRITER/250 gives the application programmer a versatile set of commands to generate final, professional looking reports which can include totals, averages, formatting and summaries. This package greatly reduces the time and cost usually involved in developing an original report format or making changes to an existing one.

Large computer features

With the HP250, thoughtful attention and care was given to the



design of a tasteful office computer. Yet, priority remained with providing system development tools to aid a programmer to custom design application packages in the lifestream areas of a company, for example finance, and manufacturing inventory.

The HP250 computer system costs \$24,500*

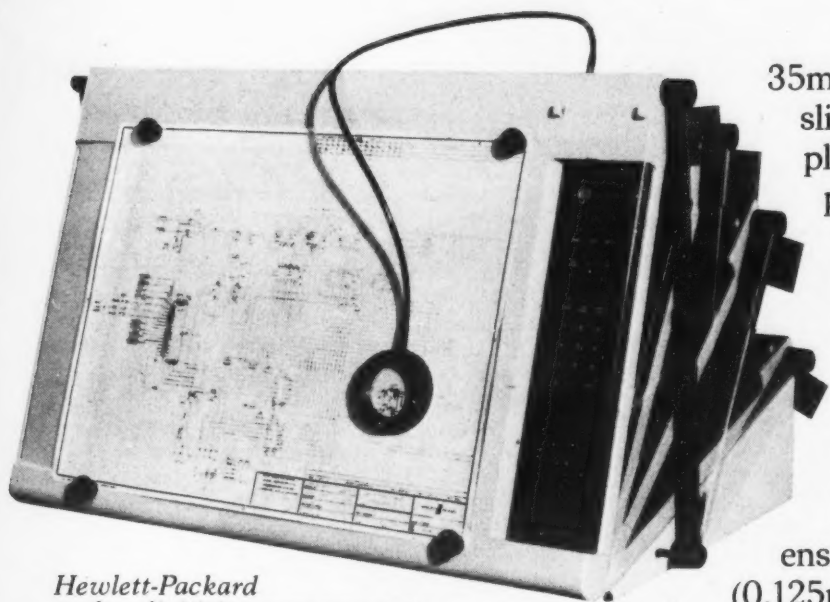
We would be pleased to share more HP250 information with you. Indicate D on reply card.

*U.S. domestic prices only.

The new HP250 computer system design reflects simplicity and end user appeal. Within arm's reach are keyboard, CRT display screen, flexible

*disc storage, and a quiet printer. With features like IMAGE/250, a true data base management system, and software tools to generate forms and reports, the price is surprising — less than \$25,000**

Got the picture? We've got the numbers.



Hewlett-Packard makes digitizing more accurate and comfortable for the user with the HP9874—a completely integrated workstation digitizer with many innovative features including a tiltable, transparent glass platen.

A new digitizer from Hewlett-Packard, the HP9874, expands the range of materials which can be digitized. Valuable data is often trapped in pictorial form—lengthy strip charts, large blueprints, and X-rays. Now there is a better way to digitize or convert this graphic data into numeric form for computer analysis and processing.

Tilt to any angle

Traditionally, digitizers have had a non-movable horizontal work area, or platen. Users had to stand and bend for many hours over a document being digitized. The HP9874 relieves this tedium—it has an innovative, adjustable, transparent glass platen. Easily tilted to any angle, you can work in a relaxed sitting position.

Digitize an X-ray

An adjustable glass platen enables the digitizing of projectable media such as X-rays, movie frames,

35mm or microscopic slides. By tilting the platen to a full vertical position and setting a projector behind the digitizer, exact images can be reproduced without distortion, then digitized.

Use of a stable material like glass for the platen ensures high accuracy (0.125mm) and resolution (0.025mm) over a broad range of temperature and humidity conditions.

To take advantage of the adjustable platen, HP developed a “vacuum-grasp cursor” which can adhere to any portion of the platen. Regardless of the platen’s position, the cursor will not slip—even if it is bumped.

The lighted cursor has an open circle target, 0.250mm in diameter, giving the pinpoint precision necessary to accurately position and then move the cursor along a line thinner than a human hair. Digitizing becomes as simple as tracing.

Smart integrated peripheral

The HP9874 is a powerful, intelligent digitizing workstation complete with its own microprocessor and 16K-bytes of built-in memory. Because of this power, the HP9874 can respond to forty high-level programming commands.

Full control of any digitizing application is at your fingertips. A keyboard, conveniently located on the digitizer, has control, numeric,

and special function keys.

Points may be digitized one at a time or continuously (based on time or distance increments) by simply pressing the appropriate key. An Axis Align key automatically aligns the x and y axes of the digitizer with those of the document—immediately establishing a new coordinate system. And, by pressing the Axis Extend key, strip charts, as long as 53 kilometers, and other large documents can be digitized with all points referenced to the initial origin.

The numeric key pad can annotate each digitized point with a numeric identifier. This feature is extremely valuable in setting up a third dimension (or z axis).

There are also five special function keys which act as triggers to initiate branching routines within a computer program. These keys, combined with the shift key, give you a total of ten.

The HP9874 is compatible with the Hewlett-Packard Interface Bus (HP-IB)** and sells for \$6,200*. **Check E for more details.**

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**IEEE Standard 488-1975 Interface.

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Lockheed System III Gains Print Spool Option

PLAINFIELD, N.J. — A print spooling routine for use on the Lockheed Electronics Co., Inc. System III is available simultaneously to both foreground and background programs, according to a vendor spokesman.

With the software, reports and other output headed ultimately for a printer are first routed to intermediate storage on disk in order to gain the speed inherent in electronic transfer compared with the comparatively slow move-

ment of electromechanical print units, he explained.

Since the facility can be used selectively, it allows one job to be run on-line directly to the printer while others, presumably less critical, can be spooled for later printing, the spokesman noted.

A distinctive feature of the Lockheed spooling capability, according to the vendor, is its support for report queue review and modification. The queue for one or more printers can be displayed on a CRT screen so the user can edit or rearrange a list as needed, at any time.

The spooling enhancement also permits a task to be interrupted and later resumed without loss of text if an item with a higher priority has to be

printed. After such an interruption, the delayed report may be restarted without any operator intervention, the spokesman said.

The queue control also enables the user to string together all reports that require a given special form. This simplifies the operator's work and, once the initial form is properly aligned, allows a greater volume of work to be handled without readjustments, he added.

The spooling facility requires a Lockheed System III with at least 4K bytes of main memory and a 10M-byte disk subsystem. The \$1,000 software supports business systems utilizing multiple terminals and printers.

Lockheed Electronics' address is simply Plainfield, N.J. 07061.

Data May Be Well Ordered Despite Confused Sources

(Continued from Page 34)

Figure 2 applies these concepts to our financial analysis applications. The CUSTOMER, PRODUCT and ORGFILE files are available to one or more applications. The applications themselves are profit center analysis and product sales analysis.

The Profit Center Results file contains key financial indicators, such as revenue, costs and profits, broken out by profit center and customer.

The Product Sales file contains unit costs, prices and volumes and may break data out by profit center and customer for each product.

To implement a data base system like this, you need to start with only one application and its associated RFs and UFs. As additional applications are added, they will have their own RFs and may add or share UFs.

The advantages of the data base approach include the following:

- *The elimination of data redundancy.* Each type of data resides in one file or segment type and is maintained by its own update process.

- *Data control.* Each type of data is maintained by a responsible individual. With the data on a "short leash," it is fairly easy to maintain data quality.

- *The multiple usage of data.* Each file may be shared by other applications and users.

- *Data independence.* Insofar as data is defined in terms of relationships, not structures, and is retrieved by name and not by position, the need to reprogram when data base changes are made will be minimal.

- *Versatility in representing relationships.* As an application evolves, the data base may be restructured for the purpose of convenience or efficiency.

- *Modular expansion.* New applications can be added with zero impact on the old ones.

- *Flexibility.* This helps meet requirements which are presently unforeseen.

Any good thing brings with it some caveats. With a data base system, you will be concerned with:

- *Data integrity.* The elimination of file redundancy means that only one active copy of a data type is needed. Loss of this data through system malfunction and "acts of God" may affect several applications. Therefore, backup and recovery procedures must be established and journals or transaction logs kept.

- *Security.* Elaborate systems have been developed to protect files, records and even individual fields from unauthorized access. This will be to no avail if passwords are casually displayed or if the computer center maintains an open door policy.

Comprehensive security can be cumbersome. But it can afford meaningful protection if rigorously applied.

In conclusion, we have seen that designing applications around utility

files permits the user to fully exploit the inherent advantage of a data base. The problems related to data integrity and system security are real but manageable in the data base environment.

Roach is a senior consultant for Mathematica Products Group, Inc.

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'MRS' Uses CICS, DL/1

LYNBROOK, N.Y. — IBM 370 users working with CICS and DL/1 can gain an on-line inquiry capability by acquiring the Management Reporting System (MRS), according to the vendor, Infopac Associates, Inc.

MRS is a terminal-based inquiry language that can extract selected information from DL/1 data bases and queue the results for later display on any terminal in the system. The terminal operator triggers the displays by entering a few simple parameters, a spokesman claimed.

Although MRS is an application program that runs under CICS, the user's view of the facility requires no understanding of either CICS or DL/1, he said, adding that the

package's operations should take only a few minutes to learn.

Use of the software requires no changes in either the operating system or DL/1. Certain CICS tables — PPT, PCT and DLZNUC — must be modified, but even with these changes, the user's personnel can install MRS, Infopac said.

MRS requires a basic system configuration of DL/1 Release 1.2 and CICS/VS Release 1.2. It is upward-compatible with later releases of both these IBM software products, the spokesman stated.

The package costs \$4,990, plus a \$500/year maintenance fee after the first year of use and is available from Infopac through P.O. Box 591, Lynbrook, N.Y. 11563.

Payroll Package Choices Execute on Wang Systems

GRANTS PASS, Ore. — Users with almost any configuration of Wang Laboratories, Inc. hardware can run payroll accounting, for multistate operations if required, with the Payroll 401 package now available from the Data Train, Inc. (DTI).

While 401 supports most of the standard payroll processing steps, from gross pay and tax calculations to preparation of federal and state reports, an enhanced package, Payroll 402, also provides labor distribution or job costing help, a spokesman said.

With either package, tax tables for federal, state and local levies — if determined on a percentage of gross pay basis — are provided and can be used

with hourly and salaried personnel. The tables are maintained by the vendor and current copies are supplied on a diskette, for \$55, whenever the user wants them.

Accounting reports including breakdowns by department are part of the system as are union dues reporting and an open-ended report writing facility.

One of the unique features of the package is its acceptance of control statements through which the user can select the specific disk storage devices to be used. This facility simplifies the process of converting from one type of disk to another, DTI noted.

As many as 255 employees can be handled on dual floppy disk configurations, the spokesman said, adding that the software requires 8K to 16K bytes of memory and either dual floppies or a hard-disk Wang system.

Distributed in object code only, the 401 package costs \$750 while the enhanced 402 version costs \$900, DTI said from Suite 3, 840 N.W. 6th St., Grants Pass, Ore. 97526.

Seminars Teach Data Control

ROCKVILLE, Md. — Assuming "the boundaries between DP and noncomputerized information handling are shifting and gradually disappearing," Data Resource Management Associates (DRMA) has organized two seminars to be presented in various cities this autumn, to deal with the problems passed by that disappearance.

"Managing Data as a Resource" was designed to make records and paperwork managers, as well as DP managers, aware of the needs and potentials in managing data and information as a resource of the organization, a spokesman explained.

Taught by Arnold Barnett and Daniel Schneider, the course will be offered at the Crystal City Marriott in the Washington, D.C., areas in late October at the Clift Hotel, San Francisco, in mid-November and at the Marriott Inn in Orlando, Fla., in mid-December.

"How to Build and Use a Data Resource Directory," the second seminar, is said to present specific guidance for analyzing and working with the contents of paperwork.

To be taught by Barnett and Donald McCarthy, this seminar will follow the other in Washington in early November, in San Francisco later that month and in Orlando on Dec. 13-14.

Each of the seminars carries a registration fee of \$375.

DRMA is at 19 Orchard Way North, Rockville, Md. 20854.

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Uses Touch-Tone Phone Access IBM Voice Storage Network Described

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — For more than 30 months, IBM has been operating an experimental in-house voice storage message network that allows users terminal access from any Touch-Tone phone.

Known as the Speech Filing System (SFS), the computerized voice message system was described here recently by Stephen Boies, SFS manager at the Thomas Watson Research Center in Yorktown Heights, N.Y.

Speaking at a session of Compcon '78,

sponsored by the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE), Boies explained that SFS is controlled by a System/7 and a 370/168 at the center and is being used by about 180 IBM staff members to perform a variety of tasks, some of which are not possible with similar electronic message systems.

According to Boies, an industrial psychologist, SFS was designed to make the user feel comfortable with the system. For example, a user can pause as messages are spoken into a telephone, and as long as no "ohs and ahs"

are entered, a speed-up feature will make the user sound like he knows exactly what he is talking about.

This ability to speed up message playback is accomplished by a "pause compression"

CW At Compcon

feature built into SFS, Boies explained. Users who have a habit of using extraneous expressions quickly stop when they discover that these sounds are being recorded by the system, he said.

Beyond its ability to clean up paused speech, SFS provides users with the ability to enter, list, index and store verbal messages from any Touch-Tone phone. For example, the system can be programmed to alert a user of a scheduled meeting by calling him at a preset time at a particular telephone — possibly in a hotel room, Boies revealed.

Messages are recorded in the 370/168 using a specially adapted analog-to-digital converter that allows the CPU to store the data in memory. The 168 runs with 100M bytes of on-line storage and the system con-

(Continued on Page 52)

Easy-to-Use Teller Terminals Succeed in Retail Locations

Special to CW

NEW YORK — The Dime Savings Bank of New York has implemented an on-line terminal network in retail store locations that is designed for operators with minimal banking and DP experience.

"Our customers have been delighted with the concept of combining their banking and shopping in one convenient trip to a nearby location," according to John Jorgensen, the Dime's senior vice-president for banking operations. The savings and loan now runs 14 "customer and banking convenience centers" at TSS department stores and Pathmark and Waldbaum supermarkets in metropolitan New York.

In shopping for a teller terminal system, the Dime specified CRT displays for teller prompting and natural language queries; flexibility in setting up teller and administrative workstations; a facility for on-line text editing and document validation; and complete audit control, Jorgensen said.

Furthermore, the institution required off-line operation for such tasks as teller prompting, data capture and balancing.

"Since the customer and banking convenience centers were to be operated entirely by retail store employees — with no previous banking experience — ease of operation was of the utmost importance," Dime vice-president John MacLean added.

"Dime personnel would provide the in-store operators with some initial training and supervision, but the day-to-day operation had to be self-sufficient," MacLean continued. "Olivetti Corp. was the only vendor

at that time using a floppy disk unit for program loading, data storage and reentry.

"We liked the floppy disk because it was considerably more efficient and convenient than other re-entry methods, including cassette tape," he added.

The final factor in the award decision was the vendor's ability to meet the Dime's scheduled Sept. 1, 1976 opening for the first centers. Olivetti was able to meet this dead-

(Continued on Page 52)

Programmable Modems Offer Net Management Advantages

By William F. Siegrist
Special to CW

Automation of two key communications network management functions — circuit failure identification and problem isolation — can reduce circuit restoration time from hours to minutes. Both functions, as well as the restoration process itself, can be readily automated on networks employing programmable modems.

All high-speed modems perform error analysis in order to reconstruct transmission signals, but the resulting impairment data is difficult to extract from nonintelligent modems. Programmable modems often employ dual microprocessors and easily modified software rather than hardwired logic to control modem functions. As a result, impairment data can be captured, stored and trans-

mitted as digital words, allowing data on circuit quality to be retrieved and measured in real time.

Users can demand restoration of circuits that fall below quality levels specified by the Federal Communications Commission, but only if they are aware of circuit performance levels. Measuring that performance has traditionally been a time-consuming and costly process.

Users Options

Users can ask the telephone company to perform diagnostic tests on the line or try to diagnose the impairment themselves. Normally, such diagnosis requires sophisticated equipment and personnel at central and remote sites.

(Continued on Page 50)

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Ascii Teleprinters Offered In Customized Versions

IRVING, Texas — Vardon & Associates, Inc. is offering users customized versions of Ascii teleprinters.

Called the integrated microcommunications terminal line, teleprinters can be configured with up to 16K of programmable read-only memory (Prom) and 16K of random-access memory (RAM) and are available for lease or purchase depending on user requirements.

A variety of features are available on the customized terminal. For example, outgoing messages can be transmitted on any of the lines by keyboard dialing and incoming messages can be entered in memory

and displayed when the terminal is not being used.

Vardon noted that received messages can be transmitted on another channel and the system is self-testing. It performs a dynamic, end-to-end or loop-back system check.

Typical price for a Teletype Corp. Model 43 with 300 bit/sec teleprinter would be \$138.23/mo on a 12-month lease or \$2,850 to purchase. A Digital Equipment Corp. Decwriter II LA 36 with 120 char./sec printer would cost \$200.31/mo or \$4,130 to purchase.

Delivery is about 60 days from Vardon & Associates, Inc., 930 N. Beltline Road, Irving, Texas 75061.

Programmable Modems Aid Management of Networks

(Continued from Page 49)

Tech control centers are designed to diagnose circuit problems after they have been reported. Tech control equipment can monitor the interfaces between a modem and the terminal and circuit it serves, can initiate loopback tests and can generate special test patterns while examining data streams.

More recently, remote diagnostic capabilities have been added to some tech control centers through allocation of excess bandwidth to noninterfering, low-speed diagnostic channels. Diagnostic commands can be sent to unattended remote sites to perform tests previously restricted to central sites.

The concept of remote diagnostics

over noninterfering channels and the concept of real-time network monitoring take on new dimensions when programmable modems are used on a network. Network control systems such as Analysis, based upon programmable modems such as the MP-48 from Paradyne Corp. of Largo, Fla., shorten the time required to identify the source and isolate the cause of a failure within a network and can also enhance restoration techniques.

Under this concept, for example, commands are sent from the host mainframe to a central site diagnostic processor which directs the modems and receives information on network performance from the modems over the secondary diagnostic channel.

Because the modems used are programmable, the central site system can be assembled from off-the-shelf mini-computer hardware: a display for operator interaction and information direct access storage for data on telephone company parameters, information for management reports and screen formats and an optional log printer for an audit trail of network alarms.

Central Site Control

Circuit quality parameters selected by the central site operator can be "down-line loaded" to the remote modems. The central site diagnostic system scans each modem on the network. When a parameter is exceeded or a modem interface problem occurs, an alarm is raised in the remote modem. The alarm condition is immediately reported to the central site and displayed for the operator.

Network control systems based upon programmable modems allow tests to be executed centrally, without expensive personnel and costly equipment at remote sites. Without programmable modems, diagnostics and monitoring are generally limited to the modem interfaces, allowing operators to say, for example, that the signal quality lead indicator is "off," indicating probable errors in data received. With a programmable modem, it is possible to say that errors are occurring because peak-to-peak phase jitter exceeds its 10-degree tariffed limit.

That degree of precision saves telephone company test time. It is possible to achieve this precision in other ways, but those ways take longer and require costly, sophisticated equipment. Programmable modems make that precision available immediately and economically.

Finally, programmable modems make it possible to detect gradual degradation in the quality of a given circuit. If the remote site to be affected is critical, restoration action can be taken before the circuit fails. Monitoring of circuit performance trends, along with the use of programmable modems, makes it possible to vary the filtering techniques used on modems in the network.

In short, programmable modems carry the state of the art in tech control to the level of cost-effective network management, and with that comes greater network availability.

Siegrist is modem product manager at Paradyne Corp. in Largo, Fla.

What to do for a DBMS headache.

A look at data base management systems in our October 30th Special Report.

Getting the right information to the right people at the right time can create tough problems in any large DP system. And the increased bulk of associated information that DP systems handle means a need for more efficiency, capability, and responsiveness.

Data base management systems — the heralded, but controversial solution to increased systems complexity — is the subject of our October 30th *Computerworld* Special Report. Edited by Don Leavitt, *Data Base Management Systems* will be examining many of the uncertainties about DBMS which make it difficult for the planner to determine whether it suits his needs. We'll have stories from users themselves, telling you how they have utilized DBMS, as well as words to the wise on DBMS "overkill". We'll have tips, pointers, and in-depth reviews on evaluating, selecting, applying, and trouble-shooting DBMS, including topics like:

- The impact of new DBMS on an organization: who "owns" the data? Who's responsible for its accuracy? Who can use it?
- Using DBMS on minicomputers [and even micros].
- Relational systems: How they're doing in the real world.
- The future of DBMS.

If you currently use DBMS software, or are planning to buy, this Special Report will be of special interest to you. And if you market DBMS, you'll reach a wide end-user audience here. Ad closing date is October 13th, and your *Computerworld* representative can give you full ad planning assistance. Or, to reserve space for your ad, call Terry Williams at 965-5800.



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Notes and observations from IBM
that may prove of interest to
data processing professionals

Up-to-the-Second Orders, Inventory and Results at Fisher Scientific

Treading the fine line between lean inventory and consistently high-quality customer service is never easy. But when you're dealing with 100,000 transactions a day, and items ranging from expensive spectrophotometers to the very-much-alive denizens of a 327-acre Biology Resource Center, there's no room for compromise in either accuracy or time.

Fisher Scientific Company uses an online order processing and inventory management system called FASTBACK to literally keep up-to-the-second on what they need to know. FASTBACK runs on an IBM System/370 Model 158 computer located at the company's Pittsburgh headquarters.

Thomas W. Moran, vice president, data processing, for Fisher led the way in putting FASTBACK together. He says, "We wanted FASTBACK to be able to grow along with our business and it's done just that. Today we use it to keep on top of 80,000 different items in 650,000 stockkeeping units in 33 locations while we service 100,000 customers who order by telephone, mail and wire."

FASTBACK Meets the Test

The biggest test of FASTBACK was in 1976 when Fisher received an \$8,759,000 order from the Nigerian Ministry of Education for science materials for each of that young country's 156 teaching colleges.

According to Moran: "Once the bid was in, FASTBACK helped us write purchase orders and allocate shipments on each item, over 95,000 pieces in all. To give you an idea of the magnitude of the order for Nigeria, it required 16 stretched DC8 freighters and represented the largest single-project in air freight history. FASTBACK helped us do

it, door-to-door.

"FASTBACK has allowed us to reduce inventory in outlying locations in the U.S.A.," Moran reports: "We stock fast-moving items, but if an order comes through for something out of the ordinary, it is automatically transferred to one of our giant regional distribution centers and filled from there. It's not important to the customers where the shipment comes from as long as he gets it on time."

Helping Other Departments

The system also helps other departments. Purchasing stays on top of special orders, back orders and stock availability. Finance keeps all financial operating reports and forecasts on the system. It keeps personnel records up to date. And marketing uses it for sales analyses and item-by-item sales tracking.

"FASTBACK has helped us come up with a unique service, LIVELINE, that's really helpful to our customers," adds Moran. "We're able to fill orders for live zoological, botanical and genetic specimens within 24 hours after we get the order. We get a kick out of the fact that computer specialists often talk about getting the bugs out of a computer program. Here at Fisher we've put some live 'bugs' into our system. And with FASTBACK, we can guarantee they'll arrive alive."

In Nigeria, 156 teachers colleges, like the one pictured here, use Fisher science materials for instruction aids. FASTBACK, Fisher's online order processing and inventory management system, helped handle the \$8½ million order.



Matching the Jobless to the Job in Rural Wisconsin

Unemployment is usually thought of as an urban problem, but there are people out of work in rural areas, too. Now computer-assisted job matching is helping rural Wisconsin residents find work.

This program is the first of its kind anywhere in the country outside of a major city. It matches the basic characteristics of a person — education and experience — with those of job openings, explains Hugh Kelly, a bureau director with the Wisconsin Department of Industry, Labor and Human Relations.

A state government computer in Madison, the capital, is online to state-operated Job Service Offices in Wausau

Employee Gigi Penn and employer Wausau Homes, Inc. found each other through the Wisconsin Job Service, which is pioneering computer-aided job placement in rural areas. Wausau Homes manufactures prefabricated houses.

and Merrill. When an employer places a job order in either office, the IBM System/370 reviews the entire file of applicants to identify those best suited to the opening. It provides fast attention to employers when they have a vacancy and lets them see the most qualified applicants available. The system also helps applicants by determining their unemployment benefits.

Nationwide Potential

The program has implications for the nationwide systems now being implemented in 25 states, with additional states being added as they are funded. Since the Wisconsin Job Service is part of the national network of 2,800 offices, the project has a huge potential in helping tap the reservoir of unemployed who want to find work.

And — not least in importance — it will help cut down on paperwork, freeing professional people to work directly with applicants and employers.

IBM Operating Voice Storage Message Net

(Continued from Page 49)
tains another 800M bytes in a storage subsystem to handle SFS files.

Any language can be stored in the system and there is no need to have it learn specific words from users such as is required with voice recognition systems, Boies explained.

The System/7 acts as a real-time system controller and the 168 runs under CMS for data base control.

In order to show Comcon attendees what SFS can do, Boies demonstrated its capabilities using a phone and a speaker amplifier. After calling the system and entering his password, he listed messages waiting for him and then dictated answers to a few.

Verbal messages remain active in SFS for two weeks unless other action is taken by a user. A file capability allows the user to file a message un-

der a certain indexed topic by which it can later be retrieved. Files can be built in the same way that paper files are stored except that the SFS files contain verbal messages, he said.

Asked later whether it would be possible to add a hard-copy feature to SFS, Boies said it is technically possible but has not yet been done. The primary purpose of the system is to demonstrate on an experimental basis how communica-

tions within an office environment can be implemented without reliance on conventional correspondence, he said.

Touching on privacy aspects of the SFS system, Boies said the design was based on the concept that the data's originator retains ownership of the data for purposes of modifying a message. But once a message has been heard by a second person, it cannot be

erased by the originator. This is only an arbitrary parameter and could be handled differently, he said.

SFS provides levels of access, message classification, selection of delivery, document structure and document creation capabilities. The latter two, which include text-editing-type features, have drawn only limited interest from the IBM staff members currently using the system, he said.

Users are prompted with verbal commands as each instruction is entered onto a phone keypad.

Design parameters included low entry cost, which led to use of the Touch-Tone; the ability to support various functions; and the ability to handle irregular user patterns, which are typical of interoffice messages.

Asked if IBM had plans to make SFS a commercial service, Boies said he had no information on this but added that IBM executives now using the system quickly get accustomed to its benefits.

Teller Units Easy to Use

(Continued from Page 49)
line and thus won the contract.

The convenience center terminals, Olivetti TC 800s, are dual keyboard stand-alone systems. Each system includes a single control unit supporting two keyboards, two CRT displays and a shared pass-book printer, thereby providing two complete teller workstations. The stand-alone units communicate directly with the Dime's Burroughs Corp. B6700 series host CPU, MacClean said.

The branch terminals are dual keyboard systems set up in "clustered" master/satellite configurations. In this type of configuration, all communications between the host computer and the terminals is accomplished through the master station.

The Dime's Valley Stream office has 25 of the Olivetti units in operation and is one of the largest installations of its kind, according to Jorgensen.



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Statistical Multiplexer Features Error Protection

CHERRY HILL, N.J. — The Supermux 480, a "low-cost" statistical multiplexer featuring error protection, down-line loading and built-in diagnostics has been introduced by Infotron Systems Corp.

The microprocessor-controlled Supermux 480 can reduce data transmission costs by using just one telephone line to transmit data previously carried by up to eight links, an Infotron spokesman claimed.

The device employs statistical techniques to transmit only active data input, conserving bandwidth so throughput is at least double that of conventional multiplexers, the spokesman continued.

The Supermux 480 is also said to

eliminate transmission errors. Data is buffered, checked and retransmitted, if necessary, and this is all transparent to existing terminals and software, Infotron explained.

Additional Features

Users can reconfigure remote, unattended units from the central site and monitor systems status on the unit's front panel display, the spokesman for the firm added.

The Supermux 480 is available in two models — a four-channel unit that costs \$1,500 and an eight-channel version for \$2,500, the firm said from Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Okidata CP110 Gets Interfaces

MOUNT LAUREL, N.J. — Okidata Corp. has announced two RS-232 interfaces for its CP110 matrix printer. One is microprocessor controlled with a choice of buffer sizes and the other is a low-cost, unbuffered version.

The CP110 prints 5 by 7 characters at 110 char./sec across an 80-column page using a bidirectional print mechanism that contains no brakes, clutches or dampers. Roll paper fits inside the case, making the printer suitable for tabletop CRT hard-copy applications. Tractor and pin-feed models are also available, and font selection, changeable on command, includes upper case, lower case and double width, the firm said.

Available Modes

The microprocessor-controlled RS-232 interface operates in receive-only, half-duplex and full-duplex modes.

A 1,968-char. buffer allows for transfer of a 24 by 80 CRT screen without handshaking delays. Also offered are 128- and 960-char. buffers.

Switch-selectable asynchronous transmission speeds are 150-, 300-, 600-, 1,200-, 2,400- 4,800- and 9,600 bit/sec.

The unbuffered interface is an alternative, especially for dumb CRT applications. It operates in simplex mode with a reverse channel busy signal at switch-selectable speeds from 150- to 9,600 bit/sec.

Parallel Interface

The CP110 is also available with Centronics Data Computer Corp., Hewlett-Packard Co. 2640 series and Okidata's OEM parallel interfaces. In addition, a 14 page "Application Note" booklet is available giving details on interfacing to an Intel Corp. 8080. A similar 17-page document describes the Motorola 6800 interface, Okidata said.

A friction-feed CP110 with the microprocessor-controlled RS-232 interface and a 1,968-char. buffer sells for \$1,110 in OEM quantities, while the printer with unbuffered RS-232 interface sells for \$985 in comparable quantities, the firm said from 111 Gaither Drive, Mount Laurel, N.J. 08054.

Mobile System Uses FM Radio

MIDDLETON, Wis. — A two-way, mobile data communications system employing FM radio between handheld terminals and a main computer system is available from Tau Mark, Inc.

The communications range of the Tera system depends upon radio power selected and the site geometry, the firm said, noting the low-power system has a typical range in excess of 1 mile.

The handheld device consists of a full alphanumeric keyboard and a 64-character display combined with a portable radio to allow real-time access with considerable freedom of movement, the firm added.

Tera's standard network controller reportedly includes all communica-

tions software and full in-out buffering for the terminals. The network controller communicates with the host CPU via either hardwired, phone line or other remote connections using RS-232C or 20mA interfacing.

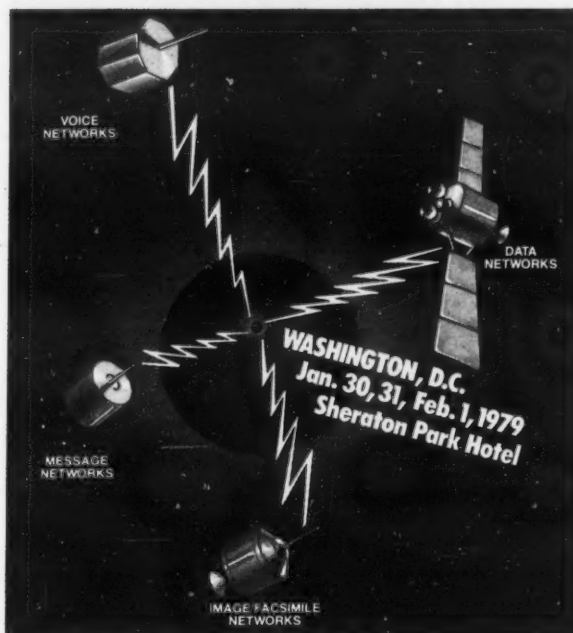
The customer may choose asynchronous serial Ascii codes or optional bisynchronous 3270 Ascii or Ebcidic emulation.

Noting that Tera will support up to 250 terminals with a single base station radio, Tau Mark said the cost of a complete terminal is \$4,695, while a base station including transmitter costs \$9,950.

Tau Mark is at 6621 Century Ave., Middletown, Wis. 53562.

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First User of Diebold 9000

IBM Loop Protocol, Non-IBM ATMs Linked

INDIANAPOLIS — Merchants National Bank here has launched an automatic banking program thought to be the first in which IBM loop protocol has been interfaced with a non-IBM automatic teller machine (ATM).

The program also represents the first installation in the nation of the Diebold, Inc. Tabs 9000 series ATMs.

According to Jim Massey, senior vice-president of the bank's Retail Banking Division, "The bank surveyed the ATM market and concluded that the Diebold 9000 offered the capabilities the bank desired of its automatic tellers. At the same time, however, the bank had reservations regarding the ability of the Tabs system to in-

terface with the IBM 3601 controller used in the bank's communications network."

Advantages Offered

Dan Whitmore, senior vice-president of operations, recalled that "Diebold demonstrated it had developed such an interfacing capability, and the decision to go ahead with Tabs 910 automatic tellers was made. The Diebold systems offered a number of advantages we couldn't find in others.

"We were particularly impressed with the Diebold ATM's display capability and the speed involved in using the machine. These capabilities, along with the ability to interface with IBM

loop protocol and the impressive knowledge of Diebold's technical support people, aided in making the decision."

As a by-product of developing the interfacing capability, Diebold created what it calls its Loop-O-Scope, a device that intercepts loop protocol and message data and displays them in code on a CRT. The Loop-O-Scope is expected to become a standard item in the inventory of technical equipment with which Diebold service personnel support the company's Tabs system.

SNA Compatibility

The bank currently has 14 of the Diebold ATMs installed at various

branches in Marion County, according to Richard Ochs, vice-president and director of the DP center. In addition to the ATMs, the bank uses IBM 3604 and 3610 teller terminals, which also are interfaced to IBM 3601 controllers.

When the bank evaluated ATM equipment, compatibility with the IBM Systems Network Architecture was a requirement. Diebold provided the systems support to interface the 9000 series to the IBM controllers, Ochs said.

The private-line network handles data at 4,800 bit/sec between the Indianapolis DP center and the 3601 controllers, while the terminals send data at 1,200 bit/sec to the controllers.

Future plans call for a total of 30 ATMs to be integrated into the SNA network. Before making the upgrade, the bank was using a binary synchronous network.

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Meet to Cover Teleconferencing

NEW YORK — The Center for Management Development of the American Management Associations (AMA) will sponsor a two and a half day meeting entitled "Computer Forms of Teleconferencing and Message Systems" Oct. 30 through Nov. 1 at the Newport Inn in Newport Beach, Calif.

The meeting will include a comprehensive look at the advantages and forms of teleconferencing and message systems. These forms include electronic mail and message systems such as Hermes and Telemail; word and text processing; the Planet system of basic conferencing; management information systems such as Emisari and Rims; and a generalized system for electronic information exchange.

The meeting will also feature live, concurrent demonstrations of each of these systems in operation. Practical applications of teleconferencing technology to various industries will also be demonstrated.

Human Factor

The meeting will include a section focusing on the impact of this technology on the psychology and sociology of its users. There will be presentations comparing alternative forms of communication such as video, face-to-face, mail and telephone.

Speakers will include Dr. Murray Turoff, director of the Computerized Conferencing & Communication Center, New Jersey Institute of Technology; John McKendree, planning officer for the Management Information Systems Project, Office of Planning and Research, Internal Revenue Service; Dr. Jacques Vallee, president of Infomedica; Ronald P. Uhlig, manager of data systems planning, Bell Northern Research, Inc.; and Walter L. Anderson, associate director of ADP, U.S. General Accounting Office, Division of Financial and General Management Studies.

The registration fee is \$525 for AMA members and \$605 for nonmembers. Information about the meeting is available from the AMA at 135 W. 50th St., New York, N.Y. 10020.

Updated Line Tester Works as Smart Monitor

WILTON, Conn. — A digital line tester reportedly powerful enough to be used as an intelligent monitor, front-end emulator, terminal emulator and loop-back tester has been introduced by T-Bar, Inc.

No previous programming knowledge is required to use the Model TD-10 because all software has been preprogrammed into the tester, T-Bar said.

The Model TD-10 is said to offer features not available with its predecessor, the TD-9. A video output unit

that allows interfacing with a larger external CRT unit is now standard, according to a spokesman.

Nine single-key functions are available that allow changes from one function to another — for example, hex to English or vice versa — without interrupting operation, he added.

Another added capability is selection via a front-panel switch of primary or secondary channels of the EIA interface for monitoring or testing purposes.

Troubleshooting Functions

The TD-10 allows operations personnel to verify the integrity of data within a communications network, to isolate problems caused by operator input, improper software information

and hardware failures and to pinpoint garbled data caused by noise on the telephone line.

Customer-selected circuit parameters can be preprogrammed and stored in a fixed memory to reduce tester setup time, the spokesman noted. Two standard sets of parameters and an optional third are available for customer selection.

Each set of parameters includes data codes, formats, bit rates, number of stop bits, synchronous character bit configuration, front-end poll message, terminal response message and poll interval timing.

The TD-10 is message-oriented and displays transmit and receive data on separate lines for easier reading, T-Bar said, adding that half- and full-duplex

data can be displayed.

Standard functional specifications reportedly allow use in synchronous and bisynchronous protocols, using Ascii and Ebcidic codes at speeds up to 9,600 bit/sec with storage of 3,500 bytes for later recall, the spokesman added.

Intermessage timing, duration of the request to send, clear-to-send and modem turnaround time are displayed in milliseconds. Other codes and protocols — including Synchronous Data Link Control, High-Level Data Link Control, BCD, Ebcidic, Baudot and Ipar are optionally available.

The TD-10 — which can be used as the central tester with T-Bar's Multiple Access Switching System — costs \$9,000. T-Bar is at 141 Danbury Road., Wilton, Conn. 06897.

Comment Period Opened by Ansi On BSR X3.79

WASHINGTON, D.C. — "Determination of Performance of Data Communications Systems That Use Bit-Oriented Communications Control Procedure" is the title of a proposed American National Standards Institute (Ansi) standard recently accepted by the X3 Committee for public review and comment.

The comment period for the draft document ends Jan. 22.

This proposal, identified as BSR X3.79, was developed by Technical Task Group X3535, of which George J. McAllister of Bell Laboratories is the acting chairman. This group also prepared X3.44-1974, an earlier standard which applies only to performance of character-oriented communications systems that use Ascii control characters for link control.

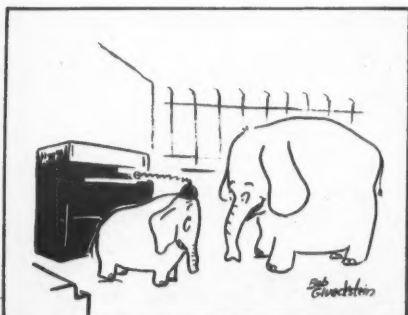
While the previous standard covered only the performance of data communications links, BSR X3.79 is applicable to links and data networks using the emerging bit-oriented communications control procedures.

Criteria Expanded

The performance measurement criteria defined in the earlier X3.44-1974 have been retained and expanded, Ansi said. The values of these criteria can be calculated and can be measured. They can be used to specify, evaluate and compare the performance of links or of networks, according to a spokesman.

It is further intended that they be used to evaluate performance on an operating basis and be sufficiently sensitive to performance deterioration to aid the user in applying corrective measures, Ansi said.

Copies of the proposed standard can be obtained for \$3 prepaid from the X3 Secretariat, Computer and Business Equipment Manufacturers Association, 1828 L St. N.W., Washington, D.C. 20036.



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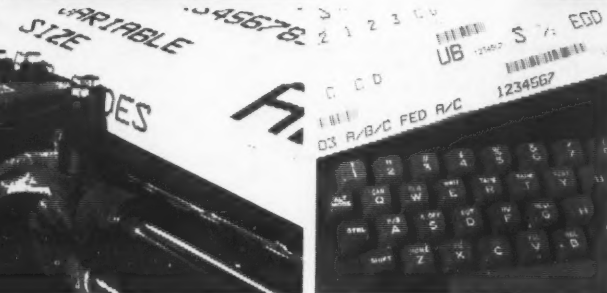
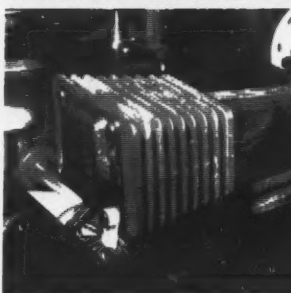
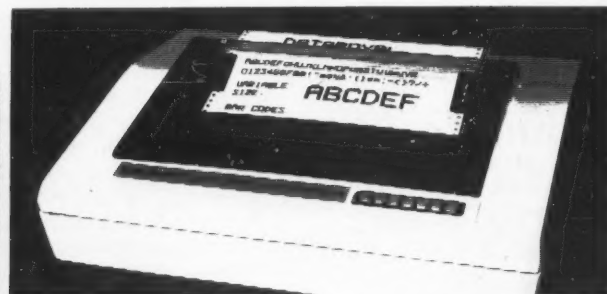
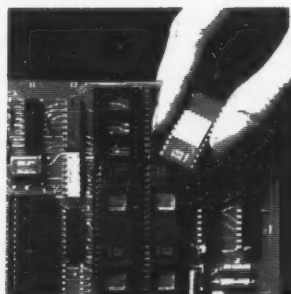
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Terminal Offers Graphics Features

SUNNYVALE, Calif. — Agile Corp. has unveiled a terminal featuring up to 9,600 bit/sec transmission, 55 char./sec printing and "Superplot" graphics capabilities. Designated the Model A-1, it can be custom fit to individual specifications, the firm said.

The terminal can be interfaced with various storage devices for off-line data entry, text editing and word processing. Optional speeds permit interfacing with a CRT terminal.

Currently, more than 50 firmware options are available for the A-1 terminal and are keyboard-selectable for easy operation. These include word processing and text editing applications such as automatic justification (single/dual columns and left/right margins), automatic word wraparound

(eliminates keeping track of number of words per line) and proportional spacing.

Other firmware options include variable transmission rates (600-, 1,200-, 2,400-, 4,800- and 9,600 bit/sec); IBM 2741 and 3767 modes; an additional 256-char. buffer; and a "print enhancement" feature that allows automatic overstrike and underscore for bolder, enhanced, faster printing.

A standard feature of the Model A-1, the firm said, is its ability to plot data at the terminal in two modes. In basic plot mode, the A-1 plots and prints data points in any direction as they are generated. Four controls serve to monitor horizontal print wheel movements (forward and backward) in 1/60-in. increments and vertical paper move-

ment (upward and downward) in 1/48-in. increments. An operator can add text while the graph is being produced, the company said.

Superplot Mode

In Superplot mode, up to 14 increments of movement can be effected simultaneously in both horizontal and vertical directions, using a single character command. Graphics can be produced five to 50 times faster than in Basic mode. In addition, Agile's plot support package is available on most major commercial time-sharing systems, allowing users to interface the Model A-1 to proprietary plotting systems quickly and easily.

The Model A-1's standard print speed is 30 char./sec, with 45- and 55 char./sec optionally available. The terminal has a daisy wheel print mechanism that reportedly prints sharp, clean, clear characters. A total of 50 fonts (10- and 12-pitch) are presently available, including legal, scientific, APL and foreign language faces.

The standard Model A-1 terminal, including stand, costs \$3,475. An A1-R receive-only version costs \$3,250. Lease/purchase is available, Agile Corp. said from 1050 Stewart Drive, Sunnyvale, Calif. 94086.

Impact Printer Offers User Selectable Forms Control

NATICK, Mass. — The Integral Data Systems, Inc. IP-225 impact printer features tractor-drive forms control with eight switch-selectable sizes from 3 in. to 14 in.

The microprocessor-controlled unit is RS-232C and parallel TTL-compatible and provides a full upper and lower case Ascii character set, the firm said.

The IP-225 can print multiple copies on pin-feed fanfold paper and forms up to 8-1/2 in. wide, the firm continued, adding that printing rates of up to 100 char./sec are achieved with a sustained throughput of 50 char./sec at 80 column/line.

The printer's character format is a 7 by 7 dot matrix, and line length is 77 columns at 10 char/in.

Software and switch-selectable print densities of 8.3-, 10-, 12- and 16.5 char./in. are featured, a spokesman for the firm said.

A "full" CRT multiline buffer of 2,048 characters and a graphics capa-

bility with contiguous horizontal and vertical dot plotting are optional.

With quantity discounts available, the IP-225 printer costs \$949, the firm said from 14 Tech Circle, Natick, Mass. 01760.

POS Terminal Performs Range of Register Tasks

BATON ROUGE, La. — Chase Computer Corp.'s Model 2200 retail point-of-sale terminal performs cash register functions such as multiple sales ring-up, discounting, handling split tendering cash transactions, in-house charging, major credit card charging and handling nontaxables within a transaction.

The terminal functions as a data entry device by recording transaction information captured at the point of sale, Chase said.

Software Support

To support the retailer, a software system available with the terminal can process the captured data to generate management reports and information

concerning store profitability, inventory control for hard goods and soft goods, credit control and other factors.

A polling package, comprehensive editing and data base reformatting software are an integral part of the supporting software system, which can easily integrate the 2200 into the retailer's operational software, Chase claimed.

The intelligent component of the terminal can be disconnected from the cash drawer, allowing the retailer to use the 2200 as a back-room intelligent terminal, the firm continued.

The terminal costs less than \$3,000, Chase noted from Suite 404, 4962 Florida Blvd., Baton Rouge, La. 70821.

DEC OEMs Get Service Assist

SKOKIE, Ill. — A technique for the Digital Equipment Corp. OEM to provide immediate programming and diagnostic services to remote clients with troubled DEC CTS300 systems has been introduced by J. Baker & Associates, Inc.

The OEM can use Baker's Remote Communication System (RCS) to assume full control of the client's CTS300 from anywhere in the continental U.S., the firm said.

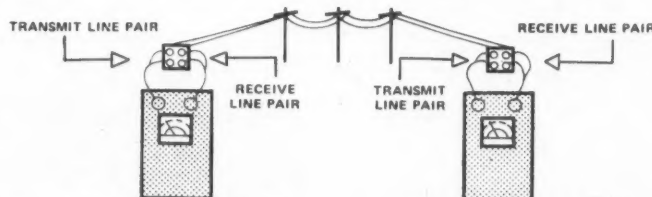
While the OEM is accessing the client system, the client is locked out. Any of the CTS300 development functions are available at the OEM's CRT terminal, the firm explained, adding that the OEM can then analyze the situation and make any program or master file changes necessary via a text editor.

The program can then be recompiled and relinked in its corrected form, and the OEM can verify correctness by remotely executing the program before transferring control back to the user via telephone, the firm said.

The RCS costs \$750 from Baker at Suite 106, 5135 W. Golf Road, Skokie, Ill. 60077.

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First Commercial User Installs Cray-1

By Brad Schultz
CW Staff

KANSAS CITY, Mo. — Cray Research, Inc.'s Cray-1 mainframe — generally regarded as the world's most powerful computer system — has been installed in a commercial environment for the first time.

United Computing Systems, Inc. (UCS) — a service bureau here — plans to employ the Cray-1's numbercrunching superpowers as the basis of remote computing services.

UCS intends to aim its Cray-1-based service at the "heavy computation" and business data management user, according to UCS executive vice-president Jerry Howard. Access to the mainframe, front-ended by the firm's two Control Data Corp. Cyber 175s, is intended to be an "additional" service, rather than a replacement for current capabilities.

With 18 CDC mainframes at facilities in Kansas City and London, UCS is one of the largest commercial users of CDC equipment, Howard said. However, the firm rejected CDC's Star-100 and Cyber 176 mainframes as candidates for driving the new "super" service for reasons of cost/performance.

Its eight CDC 6000 series mainframes, three Cybers (one Model 174 and two 175s), four 3600 series and three 3300 series mainframes demonstrate UCS's conviction that large-scale systems are the most effective way to deliver remote computing services, Howard remarked.

Smooth Conversion Expected

UCS tries to run its shop with as much transparency as possible — with very little outward change as far as the customer is concerned, he added.

The Cray-1 will reportedly require little conversion effort — in terms of cost and complexity — by UCS or the UCS customer in accommodating existing software programs.

However, UCS does recognize some disadvantages inherent in the Cray-1. It uses a slightly different Fortran from that the firm is accustomed to and Fortran IV is essentially the only language currently available on the system. In addition, Cray's operating software delivers only a batch capability.

With considerable expertise in operating system development, UCS may have to develop its own interactive capability for the system, Howard surmised, indicating that the service vendor's 2,000 customers do demand an interactive option. On a typical day, of about 14,000 to 15,000 users, 500 to 600 are on the system at any given time.

The cost of Cray-1 service will probably be about three times the current cost of Cyber-175 service, Howard said, noting,

however, that charges will not be set until after acceptance testing of the system.

Second on Order

Nevertheless, UCS claims to be "oversubscribed" with work awaiting the half-million-word Cray-1 installed last week and has ordered a million-word Cray-1 for installation late in 1979, according to Cray Research's communications coordinator, Bill Scholer.

In fact, UCS has expressed interest in the planned successor to the Cray-1 — the Cray-2 mainframe, which is now "somewhat beyond the drawing-board stage" in development, he added.

Basically intended for scientific applications that involve much calculation as opposed to string processing, the half-dozen previously delivered Cray-1s have gone entirely to government users in the U.S. and Europe, Scholer noted.

The first Cray-1 went to the Los Alamos Scientific Laboratory in New Mexico; the second to the National Center for Atmo-

spheric Research in Boulder, Colo.; the third to the European Center for Medium-Range Weather Forecasts in England; the fourth and fifth to the Department of Defense (one of them to the National Security Agency for cryptographic applications); and the sixth to the National Magnetic Fusion Energy Agency.

Cray Research has not decided to change the computational nature of its systems by tailoring them to primarily business purposes, he pointed out, but is enthusiastic about offering the benefits of a 12.5-nsec processor cycle time to the business world. (Conventional mainframes deliver cycle times orders of magnitude slower.)

The firm has no plans to offer languages other than Fortran IV in the near future, he said, and has rejected the idea of developing a data base management system especially for the Cray-1 or forthcoming Cray-2.

However, the Cray-2 is perceived as a family of machines which in conjunction with the Cray-1 line may offer businesses a wide array of attractive configuration options, he

(Continued on Page 58)

Updated Version of CMC 1800 Offers Double Disk Capacity

LOS ANGELES — Pertec Computer Corp.'s CMC Division has announced the CMC 1800 Mod II distributed data entry system, which reportedly offers several improvements over the company's previously introduced CMC 1800, including more memory, improved language capability and additional format levels.

The CMC 1800 Mod II offers twice the disk capacity of the older system, a 2,000-char. CRT and greater flexibility of design, according to a spokesman. In addition, memory has been increased from 160K bytes to 256K bytes, allowing expansion of the range of functions provided by the system's software.

The Mod II Data Management Operating System (DMOS) enables the user to operate a maximum of 70 tasks concurrently, the spokesman said. Of these 70, 64 can be separate data entry tasks, with the remaining six dedicated to "background" jobs such as data inquiry, tape printing and tape writing. Also included in the operating system are a cross-reference capability, an improvement over the older version, as well as the ability to run remote job entry and data entry simultaneously, the firm noted.

Also featured as part of the expanded software are dynamic memory and disk allocation, the company said, as well as data and

file security and a file inquiry capability using the company's Indexed Sequential Access Method (Isam). The operating system is written in re-entrant code, the spokesman noted.

The system can emulate IBM 2780-, 3780-, 3741- and 360/20 Hasp-type workstations at speeds up to 19.2k bit/sec, the spokesman continued, adding that as many as 16 remote-access keystations can access the system concurrently over phone lines.

Additional hardware features include the ability to support two line printers, a maximum of six magnetic tapes, a card reader operating at 300- or 600 card/min and a maximum disk storage of 244M bytes.

A system with 160K bytes of memory, 61M bytes of disk storage, a CRT console, a 1,600 bit/in. tape drive, a 160 char./sec printer, 12 local 256-char. CRT stations, six local 2,000-char. CRTs and four remote 256-char. CRTs costs \$206,440. An additional 96K bytes of memory in the same configuration costs \$30,000.

The 160K-byte configuration leases for \$5,125/mo including maintenance, and the 256K-byte version is \$5,875/mo, a spokesman said from 12910 Culver Blvd., Los Angeles, Calif. 90066. Deliveries are expected to begin in the second quarter of 1979.

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Uses 96-Column Return Stub Utility Finds Billing System a Money-Saver

By Gary Geddes

Special to CW

ABERDEEN, Wash. — The Public Utility District #1 of Grays Harbor County here feels it has a money- and time-saving billing process.

In 1974, the district contracted with a software firm, Omega Systems of Lacey, Wash., to design its billing system. The utility had first thought of modifying a Burroughs Corp. customer billing package but found it wasn't what it wanted. The Bur-

roughs package did have a 96-column return stub incorporated into it, which Omega liked and adapted to its system.

The 96-column return stub has a six-digit, prepunched serial number. As the bill printing process starts, an operator need only give the system the serial number of the first bill and then the machine increments 1 for each bill from there on. This number is then matched to the customers' account number and placed in

the "serial" file.

The bills are then burst and mailed, with no punching of any return cards or collating of bills and punch cards, and no special handling of the bills required.

When the customer pays his bill, he returns only the 96-column portion of the bill; the other half is his receipt.

Groups of bills, when paid, are then put into batches and totaled. The batch totals represent the actual amount of money taken to the bank. The system shows excess and short dollar amounts.

The district posts approximately 1,000 cash items a day. It does get payments from reminder and disconnect notices as well as miscellaneous cash and partial payments, but its turnaround on these stubs is almost 75%. The district bills 18,500 customers a month out

of its total of 32,000.

The district's keypunch operator takes only 45 minutes a day to punch and verify the other 25% of the cash items.

All cash items, including punched and prepunched cards, are loaded into the system for editing. When the computer reads a serial number in a return stub (column 17-23), it goes to the serial file, finds the bill number and then finds the corresponding account number.

It then chains to the account master file, finds the balance owing and assumes that this is the amount being paid. Of course, the amount owing may not be the same as the actual amount paid, since it may be an old bill or credit or debit memo, for example. However, these differences are caught on the edit report where the computed batch total does not

equal the batch total initially loaded in.

These amount changes are made right on the edit sheet and returned so the keypuncher can punch a correcting transaction, which is processed to correct the original cash amount recorded on disk. One other edit follows and totals are again checked for balancing.

The district's system is a Burroughs Corp. B1700 with 87.5M-byte disk packs, 750 line/min printer, 64K of memory and 96-column card input.

The district buys all of its blank bills from IBM for about \$13 per thousand.

The customer billing package, written in RPG, is available through Omega Systems in Lacey, Wash.

Geddes is DP manager at the Grays Harbor Public Utility District.

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Brandon Has Contract Checklist

NEW YORK — A checklist containing more than 140 items that should be consid-

ered by the typical user in negotiating a hardware contract is being offered free by the Brandon Consulting Group, Inc.

The list is intended to help companies obtain goal-oriented contracts that outline expected results. Such contracts are preferable to those that merely describe the hardware, the company stated.

Sample items in the checklist include price protection of

hardware, software, maintenance, expansion or future development; reliance on vendor expertise; and rights to future software enhancements.

The checklist offers guidelines to the primary risks in a hardware contract as well as the less obvious pitfalls, the company said. The list can be obtained by sending a stamped, addressed envelope to the company at 505 Park Ave., New York, N.Y. 10022.

Peripherals Examined

PENNSAUKEN, N.J. — Two reports designed to help in the selection of computer peripherals have been released by Alltech Publishing.

A survey of microfilm readers and reader/printers includes data on unit type, general features, copying process, projection, screen type and size, printer speed, pricing and other data for more than 155 units, according to a spokesman. Also included in the \$10 report is a comparison chart

and vendor directory.

A second report compares 65 pieces of optical character recognition (OCR) equipment. For OCR equipment in several categories, the report compares the type fonts recognized, input and output media and codes, throughput, pricing and features and options. The report is available for \$20 from the company at 212 Cooper Center, North Park Drive and Browning Road, Pennsauken, N.J. 08109.

UCS Installs Cray-1

(Continued from Page 57)
indicated, noting that a dual-processor arrangement featuring a Cray-2 as front end for a Cray-1 is one such possibility.

Presently leasing the new Cray-1, UCS may decide to purchase it after acceptance testing, Howard observed. Scholer put the system's purchase price at about \$8.8 million, reflecting a base main-frame price, "without extras," of about \$5.9 million.

However, the history of Cray-1 sales — which so far can be counted on fingertips —

has shown that total prices vary widely from deal to deal, Scholer said, reflecting the peculiarities of the customer.

A sign of the high priority the U.S. government has assigned to the Cray-1 is reflected in the relative speed of its procurements, he noted.

Recent government reports agree that the minimum time frame for federal acquisition of a typical computer system is at least three years [CW, Aug. 21], yet each Cray-1 was snapped up within months of its availability, he said.

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ESC. And End Block character. A New Line character sequence. A field separator. And even a function sequence preamble.

Its status displays on the screen give you a conveniently wide range of information at a glance. While its special symbols indicate the entry of control characters in memory. Also, all control characters can be stored using the escape sequence or program mode. And the Field Protect Mode allows rapid data entry into forms or instruction pages.

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The terminal's displayed data is formatted in 24 lines per page, 80 characters per line. And, to top it off, it comes with a 25th line established and reserved exclusively for status indicators and messages of up to 79 characters.

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data space up to a maximum of 8 pages. And programmable function keys, to name but a few.

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LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

Scanning Lightens City's Tax-Processing Load

Special to CW

WARREN, Mich. — The City of Warren achieved a significant gain in productivity recently by installing an optical scanner system to process property tax collections and water bill receipts.

Property tax payments had previously been posted to individual ledger cards on an NCR Corp. accounting machine, a process which required a lot of time and hand labor. Scanning eliminated this effort.

Tax bills have been redesigned so the return stub includes identifying information, the amount and a double zero field.

Tax bills for Warren, the fourth largest city in Michigan, are generated once yearly by the city's computer

from a Macomb County tax roll which the county supplies on magnetic tape. The majority of returns from these bills are received in batches from mortgage companies or property agents, with a single payment check for the lot.

Payments are balanced against the bill stubs and the batches of stubs are fed into a Key Tronic Corp. M9 scanner. If payments are for six months instead of a full year, the processing clerk pencils a dash through the double zero on the bill stub. This dash mark is interpreted as a question mark character by the scanner.

The computer is programmed to recognize that a question mark character in the double zero position signifies a six-months partial payment.

A Mitron Systems MDRS-9 terminal is plug-connected to the scanner and records its output data onto magnetic tape for transfer to a Burroughs Corp. B1776 computer. The property tax payment record data is processed into the appropriate accounts, which are maintained on disk files. The payment stubs are held in their batch form because there is no longer a need to resort them by individual accounts.

Quarterly Water Bills

City water bills are mailed out quarterly to about 45,000 households and commercial establishments. Prior to the installation of the scanning system, these bills had been in the form of punch cards and returns were hand-filed in account order.

The latest bill form has a return stub designed like a property tax bill, with a line for optical scanning. Return payment stubs can be intermixed with tax receipts on the magnetic tape which the MDRS-9 records for the computer.

The two types of receipts are identified and distributed to appropriate accounts in processing. The Treasurer's Office and the City Water Department are provided with daily listings for their accounts and to service customer inquiries.

The input operation takes about 40 hours a month during the two periods when tax collections are made. This drops off to 10 hours a month for water bill periods and two hours a month at other times.

Besides eliminating the need for additional key entry staff, the scanning system has helped lighten the work load on the Water Department and Treasurer's Office staff.

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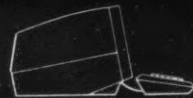
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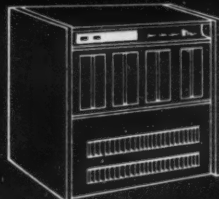
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Users Group Sets Fall Conference

SAN DIEGO — Forum International, the users group for TRW, Singer and ICL Information Systems equipment, will hold its fall conference here Oct. 23-26.

The group plans special sessions for accounting firms, retailers, small businesses and manufacturers. Other sessions will focus on Erisa and EEO tracking, broader internal use of existing systems and "mastering computerese," a spokesman said.

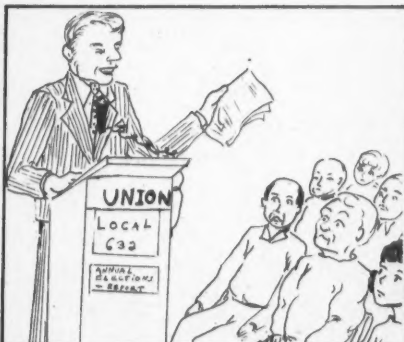
Also planned for the conference, dubbed Forum/6, is a number of specialized technical sessions, including talks on special devices, telecommunications and assembler programming. Additional information on the conference is available from Forum International, 4902 Tollview Drive, Rolling Meadows, Ill. 60008.

Micrographics Slated As Topic of Meeting

CARMEL, Calif. — The Institute of Graphic Communication will hold a three-day conference focusing on "Micrographics' Role in Future Information Systems" here Oct. 1-3 at the Highlands Inn.

The conference will feature Theodore Howes Jr., assistant branch manager for U.S. Datacorp in Buffalo, N.Y. Howes is slated to discuss "Computer Output Microfilm and Its Use in Information Systems."

Further information on the meeting is available from U.S. Datacorp at 555 S.W. Oak St., Portland, Ore. 97208.



'To Show We're for Progress, We'll Let the Computer Tell Us When to Strike.'

Alternative to Tile

DP Manager Gets 'No Static' From Carpeting

HINGHAM, Mass. — When Spencer Press, Inc., a lithography firm, undertook extensive expansions at its facility here, various types of carpeting were considered. Although the carpet selected initially was said to be antistatic, John Haney, Spencer's DP manager, questioned its use in the computer area.

After investigation, he determined this ordinary, antistatic carpet was unacceptable. Further research led him to select and install Compu-Carpet, an antistatic carpet specifically designed for computer room use.

"When I started in this business, I had a bad experience with carpet-caused static problems in a computer installation which I was modernizing," Haney noted. He described how employees put strips of carpeting over the tile floor to improve the decor and, in doing so, created static problems with the sensitive equipment he was installing.

The management would have preferred to install carpeting throughout the Hingham facility because of its aesthetic and acoustic advantages. However, at the time, the only material which assured static-free operation seemed to be hard surface floor tile.

Advice From Friend

"Even though the manufacturer of our regular carpeting assured us we would have no static problems with his product, I felt I should check it out," Haney said. He contacted a fellow DP manager in nearby Brocton, who had a similar experience in selecting antistatic carpeting for his computer room.

"He showed me the results of

six months' investigation into carpeting, and only Compu-Carpet, manufactured by United Technical Products of Westwood, Mass., claimed to offer completely static-free operation. I checked with IBM, since our installation includes the IBM System/3 Model 15B, and was told that while IBM does not specifically recommend products,

Compu-Carpet met all the requirements for approval in computer room use."

Compu-Carpet is an antistatic carpeting specially developed for computer room applications and other areas where static electricity is a problem. The carpeting material reportedly has superior electrostatic properties even when compared with tile and

other hard-surface floor coverings.

While it looks and feels like any carpeting, it limits static buildup to well below the level of sensitivity of computers and most electrostatically sensitive instrumentation. This is built into the product.

I'm glad I checked," Haney said, "because the carpeting installed in our other offices

generates enough static to cause considerable discomfort. I'm sure any attempt to use it in our computer room would have been disastrous."

"In any printing operation, you are always susceptible to ink stains. Compu-Carpet is easily cleaned and stains are quickly removed. Overall, this carpeting has been a good choice."



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OCR Makes County Billing Tasks Less Taxing

Special to CW
PHILADELPHIA, Pa. — The County of Delaware, near here is using a Burroughs Corp. S1800 document management system with optical character recognition (OCR) capability to assist in processing county taxes. The six-pocket S1800 is on-line to a Burroughs B4800 system.

Approximately 172,000 real estate property tax bills and 18,000 personal property tax bills will be processed annually, according to John V. Hartman, management consultant to the county.

Hartman described the "tax self-collection system" inaugurated by the county:

A tax bill, pre-encoded in OCR-A characters with account number, billing amount and other information, is mailed to the taxpayer in duplicate, and the taxpayer returns the original with a check for payment.

As the two documents are fed automatically on the S1800, the system reads and stores information from the

bill. The payment check stops at a "hold and view" station and the operator enters the check amount. If the dollar amounts match, the check is imprinted in magnetic ink characters and endorsed, and bills are sorted to one pocket and checks to another. Transaction information is printed on paper tape lists for each pocket for proving batches.

At the same time, information is passed to the B4800,

which updates taxpayer files.

The S1800 also provides a master tape of all transactions which can be compared with the computer printout the next day.

The S1800 also calculates that the correct amount of tax is being paid, based on the mailing date of the bill.

Taxpayers may also pay tax bills at certain local banks. The banks make up a deposit slip for the checks' total a-

mount, deposit the checks to an account for the county and return the deposit slip and bills to the county for processing. Bills are passed through the S1800 and amounts proved against the deposit slip.

If there are discrepancies in any of the processing routines documents are turned over to the department supervisor for reconciliation.

After all transactions have

been processed and accepted and files have been updated in the B4800, it prints receipts, which are then mailed to taxpayers.

Hartman said there are several advantages to using the S1800 instead of conventional methods. Key punch errors are avoided, and processing of documents is much faster. In addition, he said, OCR characters can be read easily by everyone.

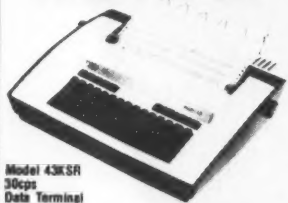
Digi-Data Adds Drive

JESSUP, Md. — A 75 in./sec tape drive from Digi-Data Corp. is said to offer users a less expensive, more reliable alternative to vacuum column drives.

The Model 1840 tape drive has a 120kHz data transfer rate and is offered in NRZI, PE and dual NRZI/PE configurations and in 200-, 556-, 800- and 1,600 bit/in. densities, a spokesman said. A dual gap, read-after-write head is standard in all versions, with an instantaneous speed variation of 3% (maximum). Also standard on the drive is tape protection in the event of a power failure, with servo control maintained to full rest.

In OEM quantities, the NRZI model costs \$2,570; the PE model, \$2,780; and the dual model, \$2,920, from the company at 8580 Dorsey Road, Jessup, Md. 20794.

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Along with this amazing capacity, VAX gives you FORTRAN speed that no other computer in its price range can touch — performance of 1200 Whetstones/second.

And VAX educational systems for large-scale FORTRAN users start as low as \$158,000. You get a VAX CPU with 256 Kb of main memory and 8 Kb

of cache, VAX/VMS operating systems with complete utilities including an interactive debugger, FORTRAN IV compiler, tape drive, 67 Mb disk, eight asynchronous lines, and a CRT or hard-copy console.

All of which makes the new human-engineered VAX the perfect system for people in computer centers and academic departments who are running big programs, arrays, data reduction and analysis, and large statistical packages.

VAX also offers ANSI 74 COBOL and full BASIC PLUS 2 to make it ideal

Fiche Reader/Printer Offered

ATLANTA — A microfiche reader/printer introduced by Micro Information Systems can make hard-copy prints of micrographic media ranging from 4- by 5 in. up to 11- by 12 in. in size.

The device, dubbed The 21st Century, works with both computer output microfilm (COM) and source document fiche, according to a spokesman.

It incorporates a 12-sq in. screen to display copy at its actual size before printing, as well as a precision prism to turn any skewed image up to 90°.

Controls on the unit regulate focusing,

print density, high/low lamp intensity and corona polarity for positive or negative film, the spokesman noted.

Interchangeable lenses provide 18X to 54X magnification, with higher magnifications also available.

Mechanical operating components are driven by a unitized chain system that eliminates clutches and solid-state and other expensive electronic components, the spokesman added.

Prices for the unit begin at \$1,295. Micro Information Systems is at 467 Armour Circle N.E., Atlanta, Ga. 30324.

Raster Matrix Method Used in Printer/Plotter

IRVINE, Calif. — A printer/plotter that uses raster matrix technology to plot on standard fanfold paper at a speed of 15 in./min with a dot density of 100 dot/in. has been introduced by Trilog.

The T-1100A printer/plotter is reportedly software- and plug-compatible with Versatec, Inc. printer/plotters. It can print at a speed of 150

line/min. as well as plot.

The unit features capabilities that the Versatec units do not have, according to a spokesman.

Among these, he said, are the ability to use standard, pin-feed, continuous forms, the ability to make up to six copies at a time and the ability to stop the unit for longer periods of time without producing unwanted "toner bars."

Printing is at 6- or 8 line/in. with a standard 96-character Ascii set in a 7 by 9 dot matrix technique.

The 10 char./in letters can form a line that is 132 characters in width, at a speed of up to 150 line/min.

The Trilog T-1100A sells for \$7,130; an optional RS-232C interface costs an additional \$300 from the company at 17845 Skypark Circle, Irvine, Calif. 92714.

Devices Control Voltage Spikes

BRISTOL, Conn. — A series of transient voltage suppressors designed by Superior Electric Co. to control momentary voltage spikes on power lines and protect computer equipment from damage is said to offer efficiency of 99% at full resistive load.

The Stabiline series offers attenuation of approximately 40 db per frequency decade above 5 kHz in 120V and 240V models, a spokesman said.

Ampacity Ratings

Ampacity ratings for the devices are 15A, 30A and 60A, with a full load distortion of less than 1%. Maximum input transient voltage on the devices is 3,000V, the spokesman for Superior Electric Co. claimed.

Prices for the units range from \$160 to \$495, depending on model and capacity, he added from the firm in Bristol, Conn. 06010.



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System Boosts Store's Programming Production

By Steen Von Holstein-Rathlou

Special to CW

EL PASO, Texas — The Popular Dry Goods Co., Inc., a department store here, has implemented an on-line system for programming development and testing to facilitate a more productive environment for its systems and program-

ming department.

The Popular has 198 NCR Corp. 280-550 point-of-sale terminals on-line to its NCR Century 251 from three stores through a network of telephone lines and NCR 751 data concentrators. The concentrators are hooked up to an NCR 725 communications processor, where point-of-sale in-

formation is captured on magnetic tape during business hours. The NCR 725 serves as the on-line communications interface with the Century 251 for credit authorization for the Popular's in-house charge accounts.

The Century 251 configuration consists of a 284K CPU, eight 658 disk drives, seven 634 magnetic tape units and two 646 printers running five partitions under the B3 Multiprogramming Operating System and is presently emulating the NCR 315 computer for the majority of the applications processed on the computer.

The systems and programming staff, which consists of six programmers and systems analysts and a manager, is faced with the rather overwhelming task of converting redesigning and reprogramming more than 23 applications, which represent about 400 programs. As anyone associated with a production shop knows, keypunching, compiling and testing of programs receives an extremely low priority. The resulting loss in valuable time and production for systems people makes their job both difficult and frustrating and affects the cost of the department by reducing productivity and thereby significantly extending the overall time that is needed to complete a given project.

Since it is not possible to provide each individual programmer with his own private computer, the alternative would be to provide the programmer with on-line access to the programs and test files in such a manner that these activities would be somewhat transparent to, and independent of, production in the computer room.

To meet this criterion, it was a must that the on-line programming development and test system be in operation full time, without unnecessary interruption, in the same manner as any other normal production processing. Available memory and peripherals were also factors in the considerations; since the hardware resources still, first of all, must satisfy the requirements of the daily production load.

Obvious Candidate

The on-line credit authorization system was an obvious candidate for expansion to provide these features. This system is placed in operation from 5 a.m. to 10 p.m. Monday through Saturday.

This system must be up at all times. It already contained all the necessary on-line I/O drivers and message-switching logic and only needed an application module added to

process another type of transaction.

In order to minimize hardware requirements and the resulting conflicts between production and program development, it was decided that the on-line programming system should include only "bare bones" features needed by systems people. These features were defined as follows:

- Entry of program source statements.
- Entry and initiation of program compiles.
- Entry and initiation of jobs and control strings.
- Entry of data items for test runs.

Text editing capabilities, as well as other more advanced features that are available in the majority of on-line programming systems, were considered an unnecessary luxury which made the price in hardware and software resources unacceptable. Another restriction to the system was that it should interface with the vendor-supplied operating systems software without the need for user modifications and the resulting problems inherent in implementing future software releases.

The implemented on-line programming development and testing system resulted in a 14K expansion of the credit authorization system and a program that functions as the

batch partition manager and on-line partition interface.

Communications between the on-line and batch partitions is carried out through a shared source/destination file.

In a typical operation, the programmer/analysts:

- Build a source program file.
- Close the program file.
- Build a JCL file for compilation of the program.
- Close the JCL file, at which time the job defined by the JCL file is placed in the batch partition execution queue.

The on-line programming development and testing system is designed as a module that may be incorporated into any other existing NCR Century on-line system, and the benefits that have been realized from this system have surpassed the expectations of an increase in programmer productivity of 20% by an actual 31%.

Computer room operations realized an unexpected increase in productivity of 50% after the implementation of this system. Program compilation has become totally transparent to the console operator, and his attention is only required when an occasional pack change is required for a test run.

Von Holstein-Rathlou is manager of systems and programming for the Popular.

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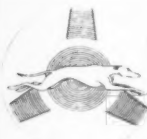
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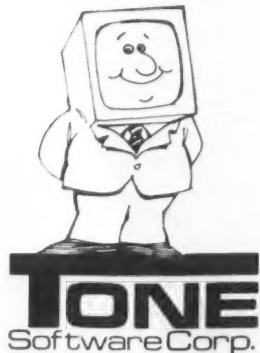
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System Replaces Office Staff User Automates All Accounting Tasks

By William Bryden
Special to CW

GOLDEN, Colo. — How do small computers, distributed data processing and the automated office fit together? Perhaps the answer to that question is illustrated by an automated accounting office there.

The operation, which requires no staff, uses a minicomputer with a floppy disk system plus word processing and communications software. Efficient and economical, the setup is the product of some 10 years of experimentation into how a professional accountant can best use computers, apart from routine bookkeeping.

Perhaps some comments about the system will prove of interest to users.

During recent years, the burden and cost of accounting paperwork has risen astronomically. The interesting thing is that the increase is not so much from processing routine transactions — it stems from the proliferation of people who analyze the information.

There seems to be an insatiable demand for more information and "controls." Management, planners, auditors and taxing and regulatory authorities continue to demand more and more information from the same base of routine transactions.

The cost of getting that information is high. The people involved are expensive and supported by costly secretarial staffs. Most of the work is performed manually. Productivity gains are minimal. We have reached the point where something has to be done to automate this area.

Natural Target

Clerical people are a natural target for small computers. There is no way to make the routine processing system flexible enough to anticipate their needs. Attempting to provide on-line access, query and computational capability necessitates costly system software and also results in degradation of system performance.

Dataroyal Boosts Speed of IPS-7000 With Three Printers

NASHUA, N.H. — Dataroyal, Inc. is offering a higher speed version of its IPS-7000 intelligent printing system as well as firmware packages that allow the printer to be configured in three different versions.

Each version pairs a 160 char./sec matrix printer with a serial interface and an 8-bit microcomputer with random-access memory (RAM) and programmable read-only memory (Prom). Previous IPS-7000 models paired the same microcomputer with a 120 char./sec printer.

The IPS versions include the IPS-7201, which can print 64 Ascii characters in a 5 by 7 dot matrix, and the IPS-7208 and IPS-7209, each printing a 96-character set in 9 by 7 matrix. The IPS-7201 and IPS-7208 offer a 500-character buffer; the IPS-7209 includes a 3,500 character buffer.

Because the systems are built around microcomputers which feature RAM and Prom, they can be configured to meet a user's requirements, the firm said.

An RS-232C asynchronous communications interface is standard. A 20mA current-loop interface is available as an option.

The IPS-7201 costs \$2,250, the IPS-7208 is priced at \$2,325 and the IPS-7209 costs \$2,410 from Dataroyal on Main Dunstable Road, Nashua, N.H. 03060.

A more cost-effective solution might be to spin off copies of the data people need and let them manipulate it with small computers.

There are a number of factors that help to make this approach feasible. Accounting work usually involves concentrated data. Much of the information that takes up space in a main system, such as names and addresses, is not required. Floppy disk storage is usually adequate. Processing speed is also not critical.

We are looking at automation of manual processes, and the time saving is dramatic on the slowest equipment. In fact, excessive speed could be detrimental.

In conversational computing, there is a tendency for the user to feel pushed by a machine and to go ahead without adequate thought.

Two Major Constraints

There are two major constraints to be faced in trying to automate this area of work. First, most of these people cannot type. Second, they want no part of programming.

In regard to the typing problem, it seems likely that for the foreseeable future any serious interaction with computers will require users to type. The software to support voice or light pen interaction is too extensive to attain widespread use.

However, most clerical people will attempt typing interaction with a computer on a

hunt-and-peck basis. Use of a CRT terminal with a text editor for correction helps.

The addition of word processing software with locate and change correction plus justified output will further aid the conversion to typing and could fundamentally change secretarial methods. Currently, most special reports tend to be handwritten and given to the secretarial staff for typing.

Experience shows that, with adequate correction software, it is more efficient to draft a report with a computer initially than to hand write, type, recheck and then change it. With available software, a mediocre typist can produce a high-quality, finished output.

The other constraint is programming. Many younger people have been exposed to some form of programming in college. When they get into business offices, they have no chance to use the skill and consequently lose what expertise they had.

The general belief in business offices is that programming should be left to programmers. This attitude partly results from the high cost of computers and could change with the current low-priced hardware.

At present, we are not going to get many middle management people doing programming.

If office people are to reap the benefits of current minicomputers, they will have to be supplied with software. This goal is not im-

(Continued on Page 68)

Novices Purchasing DP Systems Court Disaster If Unprepared

By John J. Wink
Special to CW

As minicomputer applications have diversified, many non-DP-oriented business leaders have been called upon for the first time to evaluate and select a small business system for their companies.

Computer systems represent a major capital investment for any firm, and making the wrong decision can prove at best very costly and at worst fatal to some businesses. Often these decisions are made virtually "in the dark" using the wrong criteria.

The businessman's first contact with the computer industry is usually hardware salesmen. In rare instances he will call the hardware company, but usually the salesmen have already been bothering him for some time.

They talk about the engineering attributes of their systems and the corresponding drawbacks of their competitors' equipment. The hardware salesmen also bring about the tremendous software packages they give away or nearly give away and about how easy their systems are to use.

After discussing the prospective user's needs with the appropriate officials, the salesmen prepare proposals for hardware requirements. If their companies cannot provide any necessary software, they will arrange for a software house to write the programs for an additional fee and under a separate contract.

The proposed user is then asked to sign the contract. Now he must choose a system. If everything goes well, the hardware and software will be implemented and, with adjustments, will basically do the job.

If they don't, the results can be disastrous. The typical hardware contract today offers no consolation for the user if the system never works.

As long as a configuration meets the agreed engineering specifications, the vendor has

done its job and must be paid. This claim has been tested in court, and the verbal promises of a salesman mean nothing in the face of a tightly worded contract.

What is wrong with this approach? So many things, in fact, that it is almost unbelievable that otherwise conservative, careful businessmen would spend thousands of dollars so recklessly.

Major Pitfalls

The first major pitfall concerns the justification of the computer system. Before considering a system, a businessman should identify at least one problem the computer will solve or one solid benefit it will provide.

It is not enough to feel he should computerize because everyone else is doing it. He must define clear objectives.

The next mistake a businessman with no

(Continued on Page 66)

Controller Interfaces PDP-11 and Printers

SAN DIEGO — A line printer controller for the Digital Equipment Corp. PDP-11 has been introduced by Datasystems Corp. to support either Centronics Data Computer Corp. or Dataproducts Corp. printers.

The Datasystems DLP 11 operates on any PDP-11 without software or hardware modifications, according to the firm.

The controller comes with all necessary cabling and connectors to interface directly to the printer, a spokesman noted. It features a self-test facility for easy installation and testing and Shottky TTL logic for low power requirements, he said.

The unit transfers data at 400,000 byte/sec. Power requirements are 5V at 1.1A.

The DLP 11 costs \$750 from Datasystems at 8716 Production Ave., San Diego, Calif. 92101.

INTENT TO SUE

Selection Can Spell Trouble For First-Timers

(Continued from Page 65)

prior computer experience makes is to discuss his problems with hardware salesmen. This procedure is wrong for many reasons. The hardware salesman is there to sell hardware, and he is not about to tell a potential customer that a computer is not needed.

Once he has convinced his prospect he needs a computer, then the salesman persuades the customer his company's computer is the one to buy.

Hardware salesmen describe their equipment in terms of cycle time and other engineering characteristics. These terms are virtually meaningless to the average businessman. Don't feel bad. They are also meaningless to most DP managers in large corporations. The fact is that cycle times are not as important as some other attributes.

Salesmen talk in general terms about accounts payable, payroll, accounts receivable and general ledger. They know vaguely what these things are, but they seem to think that payroll is payroll and that their packaged system will suit any application. They are simply not applications-oriented.

This fact lies at the heart of the small systems selection problem. The applications-oriented computer system is really a software system, and yet hardware salesmen usually present only hardware.

Perhaps this approach is a holdover from the days when hardware was much more expensive than software. Today the situation is different. Hardware prices have dropped remarkably, and software prices have risen remarkably.

In many cases, software is as expensive as or more expensive than hardware. Certainly software deserves as much scrutiny as the equipment it supports.

Prospective User's Tactics

What else can a businessman with limited knowledge of computers do to avoid making a costly error? For one, he can change the approach to something that makes sense.

One of these tactics, the "software first" approach, is divided into two parts. The first part is the preliminary feasibility study which will define the functions of which business consists and determine which ones will benefit from computerization.

A survey of available software is taken and a list of "near fits" is compiled. A profile can then be developed to show what hardware might be able to accommodate that software. If any necessary software must be custom-developed, it should be identified.

At this point several software/hardware combinations may be possible. Also it has become clear why a computer will be beneficial, or it might

also be clear the whole idea should be abandoned.

The second phase of the "software first" approach is more extensive. Software packages must be evaluated technically. The terms of lease/purchase must be examined.

Who owns the code? Who will perform modifications if they are necessary? Add the costs of modifications to the package purchase price when figuring the total cost.

If a custom system is required, who will do the work? This consideration is very important in hardware selection.

System software must be evaluated. Here the right hardware selection can significantly reduce the overall software cost. The purchaser should make sure the talent exists to produce the

system and is available when needed.

Evaluate hardware by its capabilities to solve the problems. Determine the manufacturer's commitment to computing. It should be more than a sideline. Don't sell new vendors short, however.

Check the system's ability to grow. If more applications will be added down the road or the business is growing by leaps and bounds, consider now how these developments will be dealt with.

Hire a Consultant

Many a businessman will say, "This is all fine, but I don't know how to evaluate software any better than I did hardware. How do I intelligently make my choices?"

The answer is simple. When who

can't do something yourself, hire someone you can. Pick a consultant.

Find a software specialist. Many firms are also hardware representatives. Their results will be influenced by the product they are selling.

Ideal Consultant

The ideal consultant has a background of heavy involvement with applications. Such a person will be able to evaluate the capabilities of software compared with requirements.

The most important thing is that a close, working relationship can be developed so that the client can feel comfortable.

Wink is vice-president and treasurer of Keynote Systems, Inc., a Pittsburgh, Pa., based software supplier.

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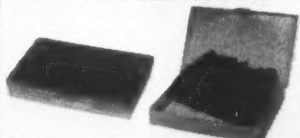
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Everyone to Feel Impact

Minis, Micros Demanding DP Career Changes

By Douglas M. Corban

Special to CW

Everyone in the DP industry will eventually feel the impact of ongoing developments in the mini- and micro-computer field.

Systems analysts will be called upon to interface micro networks. Programmers will have to write code until systems on a chip are common, and voice input could threaten the careers of all data entry personnel.

Concerned professionals must use the change to their advantage. Even though change is somewhat unnerving, resisting it is wasting opportunity. The only logical course is to learn the game, advance careers or drop out of

DP altogether.

Minis and micros are and will increasingly be accessible to almost everyone. They will continue to improve in performance, peripheral selection and cost/performance.

Moreover, users will continue to gain sophistication as the embers of DP mystique fade.

With proliferating minis and micros, programming is showing signs of becoming mundane, no longer a science and even less an art. Very large-scale integration will eliminate the how-to-code question in favor of which-chip-to-install.

The programming function could be outmoded in the future micro-mini

arena. The systems analysis function might be severely limited.

Inevitably, some users will try to implement their own systems; some will be successful. The elimination of DP overhead will be a strong sales point.

Without question, the future holds great promise for micro- and minicomputer technology, but unprepared people in our industry will be hurt.

Eventual Impact

In coming years, DP shops will become increasingly mini- and micro-computer-oriented. User needs will be met at drastically slashed costs. Project control bureaucracy will wither or die. Long lead times will not suffice. Users

will learn they can do some DP work successfully themselves.

While the nature of the DP shop will change, the manager's role will survive. There will still be definite need for coordination, someone to handle hardware acquisition and maintenance. The new DP managers will be mini-micro organizers and selectors with reduced supervisory duties.

The small systems shop will still need an analyst — but to a lesser degree. A good system will still require good systems work, but the boss is going to learn how to do some of it.

Future analysts will be expected to make a fix on the spot and to really know their business. Analysts will increasingly become trainers and advisers to small systems users.

Programmers who do not move into analyst-type functions will be less secure. Only big shops will have an ongoing need for traditional programmers.

Those without analyst aptitude, a solid business background and good user interpersonal skills will slowly slip out of the profession.

Time is running out on analysts and programmers who do not prepare for mini-micro career impacts. The time to prepare for the DP future is now.

Preparing for the Worst

How can DP professionals protect their jobs against future developments in the mini-micro field? Get your credentials up. Now is the time to get that Certificate in Computer Programming, then the Certificate in Data Processing. Dust off those plans for additional business courses. Work on a business-related master's degree if possible. The competition will be stiff, so prepare for the worst.

Get experience credentials. Build a micro. Understand the fundamentals and capabilities of new machine designs. Observe interface features and limitations. Learn strong and weak points in new technology and watch them change in price and capability.

Learn the ins and outs of small systems software, too. Become familiar with sources providing software and what their future plans include.

Get a good grip on what this technology can do for your employer and keep him informed. False hope placed in a relatively large system could spell future shock.

The DP profession is being forced to think small. Considerations such as what number of micros will be required to replace an IBM 370/138 and at what point technology will permit the replacement to occur should be paramount to DP personnel now.

The day will come when change is possible, economical and, with a lot of luck, graceful.

Resisting the change is simply not one of the DP industry's alternatives. Programmers, in particular, should begin adopting a programmer/analyst and user orientation. They must either upgrade themselves now or lose out in the rush. At the very least, they will lose their flexibility and professional contributions.

Douglas Corban is a DP consultant for McGladney, Hansen, Dunn & Co., a Rock Island, Ill., accounting firm.

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Floppy System Fits Micros

WESTLAKE VILLAGE, Calif. — A fully integrated, dual-floppy disk system has been designed by Vector Graphics, Inc. for microcomputer systems.

Called the Dual-Stor, the system comes with a controller and a dual-floppy disk drive in a cabinet that matches the Vector 1 microcomputer.

The disk system has a storage capacity of 243K bytes per 8-in. diskette and utilizes the standard IBM-compatible recording format, according to a spokesman. Using programmed data transfer, the system operates with both static and dynamic memories at a data rate of 250k bit/sec.

Compatible with the S-100 micro-



Dual-Stor

computer bus, the system features the Vector/Graphic reset-and-go function on power up, state-of-the-art technology and extensive testing procedures, the spokesman said.

The Dual-Stor costs \$2,300 from dealers or from Vector Graphic at 31364 Via Colinas, Westlake Village, Calif. 91361.

Zeta Controller Permits On-Line/Off-Line Plotting

CONCORD, Calif. — Asynchronous communications through an RS-232 interface reportedly allows a magnetic tape plotter controller from Zeta Research, Inc. to write tapes and then plot off-line without removing or transporting the recording medium.

When combined with a Zeta 12- or 36-in. plotter, the Model 6300 lets users configure an on-line deferred/off-line plotting system, according to a spokesman.

Controlled by four integral microcomputers, the system provides 20 operator-selectable plotting speeds with a maximum of 14 in./sec and produces 214 upper/lower case and APL characters at various angles, slants and

width-to-width ratios, the source said.

Besides a 45 in./sec tape transport, control electronics and a Zeta drum plotter, the system incorporates a built-in CRT terminals and keyboard that is said to permit interactive system communications with ordinary English commands.

Through the display console, operators can select optimum system speeds, scale plots, rotate plots and preprogram a random plotting sequence or multiple copies.

As part of its plotting features, the system provides an arc generator that draws circles and arcs of any radius in either direction, the spokesman explained. It also provides a dot/dash mode that produces lines and curves.

The system's automatic plot search of up to 9,999 lines reportedly eases access to plot files.

The Model 6300 costs \$13,500 and is available from Zeta at 2300 Stanwell Drive, Concord, Calif. 94520.

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Accountants Can Automate Office

(Continued from Page 65)

possible. Fortunately, while applications vary, the type of accounting work performed is similar. It usually involves manipulating files — sorting, extracting, comparing and summarizing. Some conversational computer audit software packages will give very flexible file-manipulation capability and other specialized packages are steadily becoming available. Packages can be purchased, at reasonable cost, for such applications as budgeting, forecasting, overhead cost allocation and special report preparation.

Coupled with text-editing software, packages of this type give a very extensive capability.

Getting to the Point

The point of all this is that we are at the stage where we should consider individual automated workstations. The necessary hardware can be put together for \$10,000 to \$15,000, or about \$400 per month.

When you compare this cost with the current cost of a secretary of office assistant and then consider the relative capabilities, the computer workstation wins hands down.

At present, it takes some effort to put together an automated workstation. The hardware is available, but you have to find or develop the programs. Few manufacturers are offering combined computing and text editing. They provide either text editors or small business systems but generally not both.

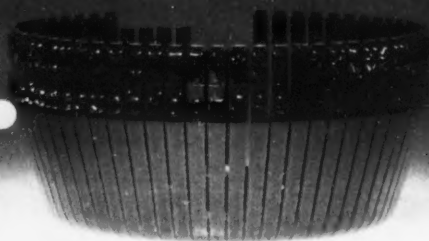
Some thought will have to be given to how to interface an automated workstation to a routine data base.

One way or another, the time for an automated accounting office appears to be ripe. It makes sense to get some of the analysis and unusual program requirements out of the hair of the regular DP group and give it to the users, who know what they want.

Bryden is self-employed certified public accountant based in Golden, Colo. The system he described is his.

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Key-to-Disk Unit Cuts Mini User's Error Rate

McKEES ROCK, Pa. — Small computer users whose businesses require volume transaction processing and data entry are turning to user-programmable key-to-disk systems to offload their mainframes. The smaller

the central computer system, the less margin there is for lengthy error correction cycles.

One such user, the Triangle News Co. here, solved its error-correction problems by replacing outmoded key-to-

tape equipment with a key-to-disk system with four data entry keystations to prepare tapes for batch processing on Triangle's 48K IBM System/3 CPU.

Triangle News distributes newspapers, magazines and other publications throughout the Pittsburgh area. Its supporting DP facility is, in industry parlance, a relatively "small shop," with only five employees. Yet Triangle's DP director, Larry Zimmerman, manages to get the most out of his equipment. According to Zimmerman, "When we replaced our old Singer key-to-tape units, we looked for a data entry system with software and program development features that would allow us to do total pre-editing and validation and still come in at a price we could afford. The Mohawk Data Sciences Corp. [MDS] System 1200 was the only system we looked at that could meet those criteria."

Only \$40/Mo More

The lease cut for the System 1200, Zimmerman said, is only \$30 or \$40 more a month than Triangle was paying for the key-to-tape units, which did not provide the intelligence needed for preprocessing. "We did look at another vendor which offered essentially the same capabilities as the 1200," he recalled, "but the cost was much higher."

In addition to performing data processing for outside companies, Zimmerman's shop handles all general accounting, transaction accounting and bulk record keeping for Triangle News.

Under an "affidavit return system," Triangle accepts publications from 40 to 50 national distributors and publishers and, in turn, distributes them to some 1,400 retail outlets such as newsstands, drug stores and grocery stores. One or two times a week, Triangle collects unsold issues from the retailers. Triangle pays its suppliers and invoices retailers only for the actual number of issues sold to end con-

sumers.

The covers of unsold publications become source documents for data entry into Triangle's transaction accounting system. Reporting to suppliers must be within 5% accurate, or Triangle would be required to forward the covers for audit.

More than 50,000 such transactions are keyed in weekly, and errors — if they were allowed to get into the batch system — would take hours to correct.

Beginning in February 1977, when the System 1200 was installed, Triangle developed two major sets of programs that would guarantee that the data collected would be completely accurate, especially as it related to accounts receivable and distribution. Utilizing a standard MDS software feature which permits users to create large tables on disk, Zimmerman created six tables that, he says, "dramatically decreased the amount of time we have to spend editing on our primary computer system."

The data entry operator has only to key in a customer number in order to get a customer name up to 30 characters and verify that a valid number has been entered.

If the operator does not have a publication number available, he may key in alphanumeric and an automatic conversion table will supply the appropriate number. Three other tables allow verification of publishers' codes and Triangle's internal magazine and newspaper codes.

Balanced Input

A second in-house-developed set of programs ensures that batch input to triangle's accounts receivable system will be in balance. Again, the purpose of prevalidation and editing is to offload the System/3 and reduce error correction cycles.

Zimmerman uses two additional MDS software features, "Source Document Control" and "General Registers," together in order to allow operators keying in invoices to retailers to balance each invoice individually.

Systems Extend Disk Choice

PALO ALTO, Calif. — A line of microcomputer systems from Dynabyte, Inc. introduces a disk drive controller that increases the choice of disk storage configurations.

The top-of-the-line unit is the DB8/2, which offers up to 1.2M bytes of mass storage on two 5-in. drives. It

8-in. drives in dual density on either one or two sides.

To permit expansion of the system as the user's needs increase, the controller is capable of handling up to 16 drives, Dynabyte said.

The product line's self-contained disk storage capacity is being aimed at business, professional and scientific users, according to the firm.

The product is described as yielding a double-density error rate comparable to single-density rates.

The DB8/2 includes a 4 MHz Z80 microprocessor module that also contains two RS-232 serial I/O ports, one parallel I/O port, an erasable programmable read-only memory programmer, two TMS2716 sockets, vectored interrupts and a real-time clock.

The unit has 32K of random-access memory.

The single-sided version, which provides 630K bytes of memory on the disk drives, retails for \$4,395. The double-sided version, which gives 1.2M bytes, costs \$5,195.

Dynabyte is at 1005 Elwell Court, Palo Alto, Calif. 94303.



Dynabyte DB8/2

uses 77-track Micropolis disk drives and, with a controller also introduced by Dynabyte, offers double or quad density in single- or double-sided configurations — up to eight times the capacity of single-sided, single-density 5-in. drives, the company said.

The drives are implemented on the dual-density floppy disk controller said to be the first such controller capable of handling a variety of 5-in. and

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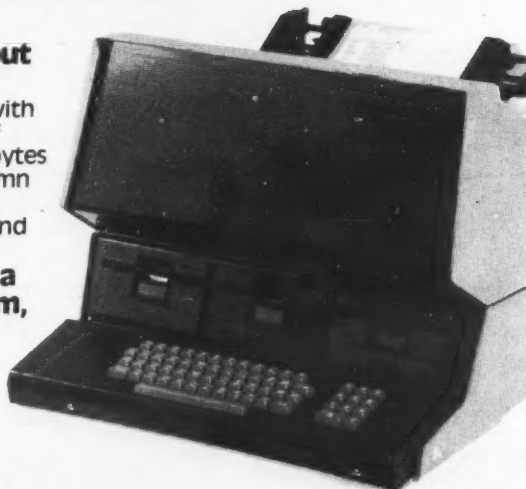
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CINCOM KNOCK-ABOUT '78 AGENDA

At-a-Glance

October 1-4

GENERAL SESSION

Evolution of Systems Design at Duriron Co., Inc.	Testing in an On-Line Environment	Auditing and Control—A Data Processing View	Federal User Special Interest Group	Leading Manufacturing Systems—A System in Transition	On-Line Inventory Recording for System 3	Variable File Performance Considerations	System 3 Special Interest Group	Preparing for the Unknown
The Future of DB—The View of the Large User Special Interest Group	TOTAL in a CPA Firm—S.D. Leidesdorf	Natalus North American Tariff Look Up System	The Art of Negotiation (Part 1)	Reliability in Financial Statement Preparation	The Concepts Of Meta-Talk	TOTAL Batch Software Exchange	Data Base Administration—Defining the Role	Concepts For On-Line System Design
Distributed Processing In The Data Base Environment	Description of TOTAL 8.0 Facilities	How To Read A Person Like A Book	Technical Considerations For A Successful First Year	Human Considerations For On-Line Systems Design	Why Do Most DP Projects Run Over Budget?	Distributed Processing in an On-Line Real Time Environment	DBA—Tech Support or Spearhead of Development	
Accelerated Thru-Put With RELEASE 8.0	Successes With TOTAL—E/I 8.0	Real Time Distribution to the Retail Food Trade	Manufacturing Material Planning Systems	Approaches to On-Line Updating of TOTAL files with E/I	Concepts of Structured COBOL			

Cincom Systems Knock-About first formed in 1970 by Cincom and its user group. It has truly become the premier forum for the exchange of information between successful implementors of data base systems.

Each year customers will gather at Cincom for the 3-day seminar. This year 1-4, to attend and participate in 8 concurrent sessions. The agenda is designed to tailor a meaningful program for the professional programmer and on-line user.

Presentations on the trends and directions in the software industry will be included in the 3-day seminar. This Knock-About is particularly significant as it coincides with Cincom's anniversary celebration of the Total Information System product package and Cincom's 10th Anniversary celebration. Included in the Knock-About will be a discussion of product enhancements and detailed information on innovative product developments. The emphasis is on practical solutions to real world problems, contributed by experienced professionals from our installations worldwide.

Cincom Knock-About '78. We can't wait for presentation time for presentation.

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Over 900 Cincom customers will gather at Knock-About '78, October 1-4, to attend and participate in 75 Sessions presented in 8 concurrent tracks. The comprehensive agenda (sample above) will enable each person to tailor a meaningful program to his or her professional responsibility—manager, system designer, programmer, data base administrator and on-line specialist.

The majority of the topics will be conducted by the Users themselves—Special interest groups will provide industry-oriented interaction and in-depth discussions on subjects of common interest.

If you are a Cincom customer, we hope to see you back at Knock-About '79 (April, 1979). We can also help you prepare your organization's DB/DC success story in time for presentation at the next Knock-About.

Presentations on the trends and directions in the software industry will be included in the 3-day seminar.

This Knock-About is particularly significant as it coincides with Cincom's announcement of the Total Information System product package and Cincom's 10th Anniversary celebration.

Included in the Knock-About will be a discussion of product enhancements and detailed information on innovative product developments. The emphasis is on practical solutions to real world problems, contributed by experienced professionals, from our installations worldwide.

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Info '78 is coming to Chicago in October, and **Computerworld** will be there to cover it. The four-day show has been sold out for months, and will feature over 200 exhibitors, 250 speakers, and an expected 15,000 attendance in the 65,000 sq. ft. floorspace of Chicago's McCormick Place. Minicomputers will dominate the show, which places a heavy emphasis on the non-technical manager.

Computerworld will be there too, and we'll have up-to-the minute coverage of Info '78 in Our October 16th and October 23rd issues.

We also have a booth there, so if you're going, stop by #184 for a free copy of our Show Issue. It'll outline the high points of the show — exhibitors, speakers, special events — along with a guide to nightlife in the Chicago area. And our October 23rd Wrap-Up Issue will have newsweekly coverage of what went on the four days of Info '78.

Ad closing dates for these two special issues are shown below; if you'd like to advertise, there's still time to reserve space. Your **Computerworld** representative can give you more information on Info, and complete assistance in ad planning.

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October 16 SHOW ISSUE	September 29	October 6
October 23 WRAP-UP ISSUE	October 6	October 13

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Teletype 40 Mechanism, Impact Printer Combined

LONG BEACH, Calif. — Teletype Corp.'s Model 40 chain printing mechanism has been incorporated into a 300 line/min impact printer to produce an output unit that is plug-compatible with most mini-computer models, according to the Printer Sales Co., the product's developer.

The TT/40, which costs roughly the same as a typical matrix printer, incorporates controllers that allow the unit to operate with parallel data channels from a CPU.

Previously, the Teletype Model 40 could operate only as a data terminal with serial telecommunications channels.

Two Versions

Packaged with an integrated printing mechanism and controller, the system comes in two models — one for 80-column output and the

other for 132-column output. Both versions print 10 char./in. on forms with up to six parts and provide a tractor paper feed for switch-selectable spacing of 3- or 6 line/in.

Users can interchange the system's chains of 64- and 96-character sets. With the smaller set, the system outputs slightly more than 300 line/min; with the larger set, slightly less.

TT/40 models that are plug-compatible with controllers for Centronics Data Computer Corp. and Dataproducts Corp. printers cost \$4,385. Versions compatible with most minicomputer models range in price from \$5,985 to \$6,525.

Depending on the model, the TT/40 is available off-the-shelf or in 30 days from the company at 2684 Dawson Ave., Long Beach, Calif. 90806.

DMA Module for PDP-11 Offers Backplane Savings

ORANGE, Calif. — Although it occupies only one slot in the Digital Equipment Corp. PDP-11 chassis, a direct memory access (DMA) module from MDB Systems, Inc. performs all the functions of its DEC counterpart, which occupies four PDP-11 chassis slots, according to an MDB spokesman.

The MDB-DR11B transfers data between the PDP-11 Unibus and peripherals as well as between two PDP-11s.

Plug- and software-compatible with the DEC-DR11B, the unit also provides features and capabilities like bidirectional exchange of 16-bit data, interrupt request and bus master control, control and status register, address se-

lection, output buffer register and input buffer gates, the source said.

The MDB-DR11B provides an optional general-purpose cable and costs \$1,450. MDB Systems is at 1995 N. Batavia St., Orange, Calif. 92665.

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Military Okays Norden PDP-11s

NORWALK, Conn. — Norden Systems's PDP-11M family of minicomputers has been given the U.S. military nomenclature designation of AN/UYK-42 (V).

This designation is used as official recognition for all armed forces applications and was designated by the U.S. Naval Electronic Systems Command, Department of the Navy.

Norden Systems, a subsidiary of United Technologies Corp., militarizes the Digital Equipment Corp. family of PDP-11 minicomputers under a special license.

Included in Norden's militarized minicomputers are the PDP-11/70M, the PDP-11/34M and the LSI-11M micro-processor. All have complete software identical to DEC's commercial software.

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Dispersed Units Up Cement Maker's Output

DALLAS — The teleprocessing capability of a data entry system has allowed a major U.S. manufacturer of cement here to more than triple the systems output of accounting and other DP reports, transmitted to the company's geographically dispersed manufacturing divisions.

General Portland, Inc., one of the largest cement manufacturers in the U.S. has manufacturing divisions loca-

ted in Texas, California, Kansas, Indiana, Tennessee and Florida.

Until the spring of 1976, the company's management information services (MIS) department used key-to-tape systems in each division to collect and send all accounting, maintenance spare parts and general personnel data to a Burroughs Corp. mainframe located at the Dallas headquarters. Once processed, the appropri-

ate reports and other forms were transmitted back to the divisions for printing, using modems and 3,600 bit/sec dial-up Wats lines.

According to MIS director Ken Hill, "Our business was growing and our report and invoice printing turnaround was becoming unacceptable; it was taking two or three days at month's end to transmit some reports because of the heavy teleprocessing traffic.

Our invoices weren't going out as quickly as desired because of the sheer volume of data print lines we had to transmit between the divisions and headquarters."

In the spring of 1976, General Portland installed Inforex, Inc. 1303 data entry systems at each division and in Dallas, switching soon after to 4,800 bit/sec lines. By using record block transmission techniques and the unattended operation

features of the Inforex systems, the company raised transmission volume and system output beyond original expectations.

With the older system, operators could send 80 line/min; with the 1303s and new lines, they now average between 500- and 600 lines/min. Rather than waiting several days at month's end to receive, print and mail their invoices, each division now gets overnight turnaround on their receivables data. Thus, they send invoices and collect payment much faster.

Decentralized Divisions

General Portland's eight divisions — Texas has three divisions — function as decentralized manufacturing operations. At these locations, several types of cement are mined, manufactured and sold to "ready-mix" companies which transport and pour the concrete for their customers.

Each division is fully staffed with operational and accounting management, but all collected data is sent to the Dallas-based Burroughs B3771 mainframe for central data processing and report generation. Different types of cement are stored for sale in large silos at the manufacturing plants.

In the manufacture of cement, maintenance job scheduling and maintenance spare parts reporting for the heavy manufacturing equipment are critical to successful operation. Fast maintenance job and parts tracking enables service personnel to respond quickly to heavy equipment maintenance and repair needs.

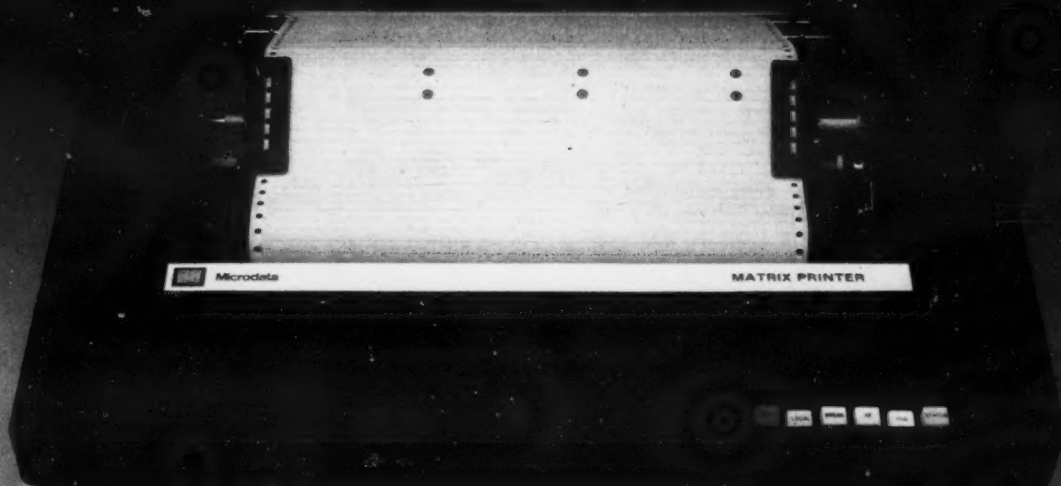
Night and Day

The DP department can process and transmit more than three million line/mo to seven divisional offices, with much of that transmission taking place at night.

During the day, the divisional office keys, collects and sends its data to headquarters. At the end of the workday, divisional personnel put blank magnetic tapes on their 1303s and set their modems for unattended operation before they go home.

At night, one person located in Dallas controls all report transmissions to the divisions.

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Societal Blessing? Cultural Curse?

Team to Probe Micros' Future Impact

By Tim Scannell
CW Staff

LOS ANGELES — Will personal computers raise the living and educational standards of future societies — or will the burgeoning technology sow the seeds of cultural chaos?

A team of University of Southern California (USC) professors, concerned with this question and countless more, will spend the next 18 months examining both the positive and negative impact that microcomputers may have on tomorrow's lifestyles.

Funded by a \$250,000 grant from the National Science Foundation, the study will first outline the areas of society expected to be affected most by the personal computer's

presence. The researchers will then recommend various alternatives and propose public policy amendments to minimize any predicted culture shocks according to Jack Nilles, USC's director of interdisciplinary studies and a member of the study team.

"Personal computers have the potential for all sorts of good things, like increasing productivity in business, improving education and increasing the quality of health care," Nilles said. "But they also have the potential for crime, invasion of privacy and things of that nature."

Besides Nilles, the USC team consists of Paul Grey, professor of decision sciences; F. Roy Carlson Jr., assistant dean of the School of Engineering; John Hayes, associate pro-

fessor of electrical engineering and computer science; and Milton Holmen, professor of management. It will base its study on the belief that an ounce of technological prevention is worth a pound of cure.

"There's always reason for concern about any technology that's going to have a lot of influence on the world," Nilles said, "because it invariably ends up having bad as well as good influences."

Nilles and his associates hope to pinpoint the possible adverse effects of personal computing through a series of interviews and question-and-answer sessions. The team will focus on and gear their questions toward small businesses, manufacturers and typical prospective home users.

"The whole idea of technology assessment, which is what we're engaged in, is to try to anticipate some of the major effects of a new technology, to make the best use of it for the people, instead of having the thing destroy parts of our culture or lifestyle," Nilles said. As an example, he pointed to the far-reaching effects of the automobile on the way people live and society in general. "An automobile is great for all sorts of things," he observed. "However, it also produces negative aspects, such as air pollution and traffic fatalities."

Probably the most numerous initial users of complete microcomputer systems, Nilles feels, will be small businesses and the more affluent individuals. "A small business is more likely to put out several thousand dollars for a system. It can more easily see being able to write off or return its investment in a fairly short time than would be an average at-home individual."

In terms of the computer industry, the biggest dollar market over the next few years will be in small business applications, Nilles observed. However, as software applications

(Continued on Page 76)

Self-Study Courses for Novices

Teach Fundamentals, Interfacing

SANTA MONICA, Calif. — Two self-study microcomputer training courses available from Integrated Computer Systems, Inc. teach the basics of microprocessor technology using a series of textbook lessons and hands-on exercises.

The first course, "Microcomputer Software/Hardware Training," was designed to present software and hardware fundamentals to individuals with no experience in computer science or electronics. The course covers architecture, program execution, program flow and loops, modules and subroutines, logic and bit manipulation and I/O programming, according to a spokesman.

The 650-page workbook/text explains vectored and priority interrupt handling, the organization of programmable read-only and random-access memories and advanced math routines, he noted.

Users are also instructed in the design and logic of a simple microcomputer system, the spokesman added.

The course comes with an assembled 8080A-based microcomputer with 1K of erasable programmable read-only memory and 1K byte of random-access memory (RAM) for programs and data. The microcomputer has a programmable I/O device with three 8-bit ports, a direct memory access (DMA) channel, an on-board 8-digit LED display and an on-board 25-key keyboard.

The second course, "Microcomputer Interface Training," is an extension of the first, the spokesman said. It consists of a 450-page manual as well as several pieces of interfacing system hardware.

The course was designed to teach the user the techniques involved in interfacing a mi-

crocomputer to a variety of "real-world" controllers, sensors and peripherals. The equipment included with the course is contained on a single board and consists of a series of timers, modems, analog-to-digital and digital-to-analog converters, teletype-writer interfaces, a thermistor, a loudspeaker, power drivers and a ribbon cable to connect the board to the host microcomputer.

The "Microcomputer Software/Hardware Training" and "Microcomputer Interfacing Training" courses are priced at \$595 and \$495, respectively. Both courses can be purchased together for \$995. An optional power supply to drive the microcomputer system is available for \$95.

Integrated Computer Systems is located at 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Three Single-Density Floppies

Include Shugart Drive Systems

HOLLYWOOD, Calif. — Three single-density 8-in. floppy disk drives from Smoke Signal Broadcasting incorporate Shugart Associates, Inc.'s drive systems and are reportedly compatible with Southwest Technical Products Corp. microcomputers.

The LFD-1, a single-drive, single-sided system, and the LFD-2, a single-sided, dual-drive model, both use the Shugart SA-800 driving mechanism. The third unit, the DFD-2, utilizes Shugart's SA-850 drive, making it a dual-drive, double-sided device, according to a spokesman.

Each system includes a disk controller board capable of managing up to four disk units; a regulated power supply; chassis; cooling fan; diskette; and interfacing cables.

The drives are compatible with the disk operating system (DOS-78) and the Disk File Basic (DFB-68) programming supplied with the firm's existing software, the spokesman added.

The LFD-1, LFD-2 and DFA2 are priced at \$1,395, \$1,895 and \$2,495 respectively. Smoke Signal Broadcasting is at 6304 Yucca St., Hollywood, Calif. 90028.

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RAM Board Built for Pet

NEW YORK — Computer Mart Systems has designed a memory expansion board to add 16K, 24K or 32K bytes of random-access memory (RAM) to the Commodore Business Systems, Inc. Pet microcomputer.

The PME-1 memory board derives its power from the Pet transformer and reportedly requires no modification of the microcomputer's power system. All memory timing is referenced to signals emitted from the Pet expansion memory connector; refresh operations are performed automatically, a spokesman noted.

The 24K version of the board allows the

writing of programs to the full capacity of the microcomputer system while the 32K package permits the user to store protected machine language programs and displays, according to the spokesman.

When running under "worst case" conditions such as machine language memory test programs, the 32K board is said to require less than 2.7W of power.

The 16K version of the memory expansion board costs \$500, the 24K unit is priced at \$595 and the 32K model costs \$675. Computer Mart Systems is located at 13 E. 30th St., New York, N.Y. 10016.

USC Team Funded to Probe Future Impact of Micros

(Continued from Page 75)
and programs make it easier for the inexperienced user to operate a microcomputer, systems will appear in more and more households.

Contrary to what a few forecasters might think, microcomputers are not destined to follow the route of the pocket calculator or electronic game and ride a temporary surge of consumer popularity, Nilles

believes. He attributed this to the microcomputer's "inherent potential" and ability to be upgraded to suit various applications and needs.

"I don't think that personal computers as gadgets will phase out anymore than hi-fi has, but what will happen is that more people will get primitive systems and eventually want to add more sophisticated things," Nilles added. "If well-designed software appears, as is likely to happen because of continued interest, then micros will maintain consumer interest."

Nilles compared the relatively young microcomputer field and the flood of new products and literature to the introduction of large-scale computers some 10 or 20 years ago. A lot of "hype" surrounded computers then, he recalled, and bad publicity emerged when the machines couldn't live up to all of the early entrepreneurs' claims.

Fortunately, "there were enough people who survived the initial overestimates and did develop practical working systems so that the industry has clearly survived."

Privacy Problem

There are, however, some serious problems that could arise should microcomputers proliferate throughout every household: "People tend to give information on themselves in a fairly off-handed manner... and it's very easy to keep that information on a data base and use it for purposes entirely different than what a person intended when he originally made the statement, particularly if personal computers are tied into networks... and people are able to zip substantial quantities of information around the country... in an incredibly short time."

Nilles went so far as prophesizing a society of microcomputer-dependent people with reams of "Peyton Place"-like data at their fingertips. "There are various ways of having a 'Big Brother'-type society," Nilles observed. "One is the government-operated sort of thing and the other could be neighbor-operated."

"That's what we're trying to find out," he said.

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Leilani Nye Johnson
Manager—Corporate Property Accounting
Memorex Corporation
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Comprehensive Report Predicts IBM to Gain in Bottom of Small Systems

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — IBM will compete vigorously in the small business systems market, gaining an increasing foothold in the low-priced sector of that market. However, IBM is expected to lose market share in the higher priced end of that market.

To compete in the small systems market, some sectors of which are growing at more than 30% per year, IBM is expected to introduce several products that will both round out its current small systems line and replace systems which will become obsolete in the early 1980s.

Furthermore, the reorganization of some

HP Touting Image As Total Maker Of Small Systems

By Marcia Blumenthal
CW Staff

BOISE, Idaho — With the introduction of its 400 line/min dot matrix printer this week, Hewlett-Packard Co. began promoting itself as the only small systems maker providing a complete line of products.

Building a complete line — designing and manufacturing at least one product in each product category — has been the aim of HP for several years, according to Bill Murphy, marketing manager of the Boise Division, which is responsible for making tape drives, line printers and printing terminals.

That strategy has a double-barreled purpose, to make it easier for end users to build a system and to allow HP to rely less on OEMs, Murphy explained.

HP found the major reason users buy from third parties is that one vendor doesn't offer all the products necessary to build a system, he said. Although HP's products are priced competitively with third parties, end users are often willing to pay more for the convenience of buying from one vendor, he noted.

From the user's perspective, two advantages are obvious, Murphy reasoned. One is vendor support; with one vendor, all problems can be handled by the same firm. Secondly, upgrades are easier; as HP "verticalizes" its products, it can offer the user more

(Continued on Page 78)

divisions, long predicted by industry observers, will occur.

These conclusions were reached by Lee Walther, president of Phoenix Systems, Inc., in a comprehensive report recently released through SBS Publishing here.

The study examined IBM product offerings in the less-than-\$4,000/mo rental range. Walther broke these out into four classes based upon monthly rental rates.

These categories were class 0 — less than \$500/mo, which includes the 400 series and models 5100 and 5110; Class 1 — between \$500- and \$999/mo, including the System/32 and System/34; Class 2 — from \$1,000 to \$1,999, including the model 1401-H and System/3 models 8 and 4; and Class 3 — \$2,000 to \$3,999, including the 1401, 360/20, System/3 models 10 and 12, 1130 and 1620.

IBM Installed Bases

IBM currently holds 3.8% of the installed systems in the Class 0 rental range. In the Class 1 category, IBM is expected to garner its greatest market share gains, according to Walther, increasing its hold from 32% in

1977 to 45% in 1982.

However, Walther maintained that IBM will lose market share in Class 2, dipping from 22.7% in 1977 to 18.2% in 1982. For the Class 3 sector, IBM will by 1982 hold only 29.3% of the market compared with the 36.8% it held in 1977.

Presently, according to Walther, only Burroughs Corp., and NCR Corp. have broad enough small systems lines to compete with IBM. However, Walther suggested IBM's future hold on the upper end of the market will slip, because it probably will not introduce the high-end innovative small systems, which he termed the System/36 and System/38, until 1980.

In the meantime, the current high-end models, the System/3 models 12 and 15, will lose ground to Hewlett-Packard Co.'s Series 3000, Data General Corp.'s Eclipse models, Digital Equipment Corp.'s 500 series and Univac's systems.

In 1977, Walther pointed out, 65,000 small systems were shipped worldwide, with an if-sold value at the end-user level of \$2.85 billion. By 1982, 174,000 such systems will

(Continued on Page 78)

Soviets Courting CII-Honeywell-Bull As Supplier of Tass System

PARIS, — Tass, the Soviet news agency recently spurned by President Carter in its efforts to obtain a computer from Univac, has approached CII-Honeywell-Bull on a "technical level," according to sources here and in the U.S.

Although the company has not received a request from the news agency to make a formal bid, the possibility remains open that the French company will become a contender for the Soviet contract. CII-Honeywell-Bull, 47% of which is owned by Honeywell, Inc., was among the original companies bidding to supply the Tass computer, a spokesman said.

The system the French company would most likely supply is the Iris-80, which is comparable to the high end of Honeywell's Series 60. However, the Iris-80 is part of a line developed by the French-controlled CII before its merger with Honeywell-Bull; although it uses

some U.S.-made components, it is considered a totally French-made product.

The Carter Administration has asked the French government to support the U.S. veto, but French authorities have said that, as a general principle, supplies of civilian equipment could not be subordinated to political considerations.

The French government did note, however, that there may be technical or security considerations which might create valid objections to a sale.

In addition to France, the U.S. government reportedly has asked Britain, West Germany and Japan not to bid for the Soviet business.

Whether Tass will buy from a Western source is still unknown. However, a decision will have to be made relatively quickly for the system to be delivered in time for the 1980 Olympics, an observer pointed out.

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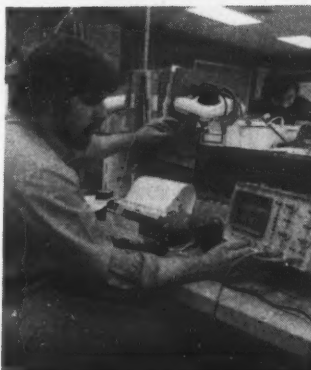
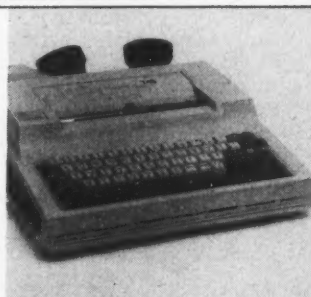


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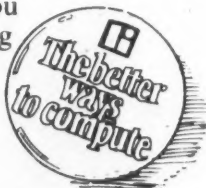
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IBM Gains Eyed in Bottom Of Small Systems Market

(Continued from Page 77)

have been shipped with an if-sold value of \$5.65 billion.

These figures reflect an annual growth of only 15% on a dollar basis because of price erosion, he noted. In terms of units sold, however, the overall growth of small systems would be 22%.

Mainframe Sales Sluggish

Detailing growth projections for the various segments of the small systems markets, the study pointed to the relatively sluggish 7% annual growth in sales of large-scale systems to large corporations.

Walther contended that mainframers have proceeded slowly with technological advances for this sector because of the large investment users must make in equipment.

Mainframe strategy has essentially been to hold the customer base by expanding the capability of each system. Because of this, Walther concluded, innovation probably will not come from mainframe technology.

Mainframers are therefore beginning to view systems as a means of expanding their customer bases and providing new opportunities to sell upgrades to small systems customers as their DP needs increase, he said.

Probable Introductions

Aside from market share and growth projections, Walther's study concentrated on an evaluation of IBM's current product mix and speculated on probable product introductions and their impact on each other and on existing products.

For instance, Walther pointed out that mid-life kickers have already been given to the System/32 and that shipments of that system will peak in 1980, just five years after its introduction, compared with the nine-year life span the System/3, slated to peak in 1979, enjoyed.

Moreover, the System/32 has a price-performance ratio of about 22 compared with the System/34's 3.3. The System/34 has negatively impacted the System/32, Walther said.

The alternatives available to IBM, Walther suggested, are to make at least a 20% price reduction or introduce systems to replace the System/32. Walther termed these potential introductions the System/20 and System/30.

The System/32 should have a price/performance ratio of 8, Walther said, but added that reducing the price of its memory by 20% and doubling its speed is not feasible. The best alternative, he decided, would be the introduction of the System/30.

System/30 Projection

Walther projected this equipment would be introduced late this year or early next year and have a price/performance ratio of 8 to 9 and a price of \$35,000. In Walther's opinion, the 30 will be a repackaged version of the System/32, but with a faster processor and larger main memory.

Until then, a 20% cut in the price of the System/32 would reduce its price/performance ratio to 17.7, which Walther claimed would continue to make the system attractive to users un-

til the introduction of the 20 and 30.

The 20 and 30 will be introduced simultaneously, Walther predicted. The 20, costing about \$22,500 and with a price/performance ratio of 7.5 to 9, would obsolete the Model 5100.

The introduction of these two systems would split the System/32 market into two segments.

Walther emphasized that the major difference between the proposed 20 and 30 will be a single vs. multiuser systems.

However, the System/34 is now eroding the System/32's appeal. The recent backlog for System/34s stood at 7,000, Walther reported, with more than one-half of System/32 users seeking upgrades.

With changing market conditions causing frequent product introductions, some divisions of IBM will reorganize as the demarcation points between product areas become more vague, Walther predicted.

As an example, Walther claimed that the System/3 Model 15 marketed by the General Systems Division has severely impacted the 370/115 and 370/125 offered by the Data Processing Division.

The complete report is available for \$1,200 from SBS Publishing, Suite 190 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Debut Marks Image Promotion

(Continued from Page 77)

choices, he said.

Broadening its product line has allowed HP to optimize its systems; now peripherals can exploit one another to mutual advantage, Murphy said, adding that all software updates will support peripherals.

"In manufacturing HP's products, we try to make a contribution to system enhancement. For instance, microprocessor control is a contribution to the dot matrix printer," he observed.

Less OEM Dependence

Along with making it easier for users to build systems, HP is attempting to rely less on OEMs. Murphy sees verticalization as an industry trend.

"Others, like Data General are doing the same thing," Murphy stressed, "but they haven't filled in all the gaps yet."

Although HP is also an OEM marketer, Murphy does not see the trend towards verticalization resulting in negative repercussions from OEMs. "Today's OEMs are sophisticated. They know their major customers will be making make/buy decisions," he explained.

As users begin to make greater use of their systems, more dollars will be spent on peripherals from a marketing standpoint, it therefore makes sense to invest in designing and making products for which there is an expanded market, Murphy added.

In developing HP's product strategy, Murphy commented, the primary concern was enhancing peripheral products to increase the salability of systems and to allow the firm to compete in both end-user and OEM markets.

Publications Report EFT Use Growing Rapidly

Banking institutions, consumers and the federal government are using electronic funds transfer (EFT) more and more these days and the field seems to be burgeoning, according to several banking publications and government reports.

- Banking institutions considering automated teller machines (ATMs) are more concerned about the costs of equipment than the transaction activity by customers, according to a survey on bank ATM performed by the Madison Financial Corp. of Nashville, Tenn., which was reported in *American Banker* recently.

The study, based on inquiries sent to 14,684 banks in January, revealed that 87% of the respondents with ATMs were satisfied with the operation of their ATMs and would install them again. Of the 2,735 responding banks (18.6%), two-thirds of the responding sample said an ATM could not be cost-justified in their markets.

However, the survey also showed 55% were considering acquiring an ATM this year and 35% of the banks that already have ATMs said they are planning to get more units in 1978.

- One year ago, consumer acceptance of bill paying by telephone had an uncertain future. However, *American Banker* recently reported that the number of banking institutions offering bill payment services has tripled since the spring of 1977, with approximately 100 institutions of all types offering bill payment by telephone to customer with accounts.

Intel Inks Pact To Acquire MRI

AUSTIN, Texas — MRI Systems Corp. announced the signing of an agreement in principle for the acquisition of MRI by Intel Corp. of Santa Clara, Calif. According to MRI President Robert L. Brueck, the company will become a wholly owned subsidiary within Intel's Commercial Systems Division.

William S. McCalmont, vice-president and general manager of the Commercial Systems Division, said, "The acquisition of MRI is a logical extension of our end-user systems business." The MRI System 2000 product line will become a valuable addition to our future product and market growth, he added.

Brueck views the acquisition as "a move which permits both MRI and Intel to reach mutual product and market goals faster than more effectively."

"Further," he noted, "this gives MRI the potential to immediately increase market coverage."

- Since 1977, the federal government has saved \$125 million by using EFTs, letters of credit and other techniques to improve cash management procedures, according to a report issued by President Carter's reorganization staff, which also claimed that the program will continue, doubling to a quarter of a billion dollars over the next two years as more government operations become part of the program.

- Brenton Banks, Inc. of Des Moines, Iowa, is marketing its own EFT program, according to the publication, *Administrative Management*. The program relies totally on electronic impulses, even for merchant and inter-bank settlements, the publication stated.

Hitachi M-200H to Hit Japanese Market This Year

SAN FRANCISCO — Hitachi, Ltd. said it would begin marketing its new M-200H, which is reportedly 60%-70% faster than the IBM 3033, in Japan later this year.

Although details on the machine's specifications were not immediately available, Hitachi claimed its M-200H is the fastest and largest general-purpose computer in the world.

The main memory of the M-200H, according to the announcement, will be capable of storing 16 million characters of information. Observers commented that the Hitachi offering will be somewhat compara-

ble to Amdahl Corp.'s 470V/7.

A Hitachi spokesman here said the U.S. office is expecting further details on the announcement from Japan. Hitachi is unlikely to market the computer in the U.S. for the foreseeable future, the spokesman said. However, he added that the option remains a possibility because the company already markets processors on an OEM basis in the U.S.

Hitachi headquarters offered no comment on the possible effects of the M-200H on IBM's business interests in Japan or whether the computer is a direct substitute for IBM equipment.

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Supershorts

Data General Corp. began shipping computer systems to customers from outside the company's plants in Massachusetts. More than a dozen systems were recently shipped from DG's plant in North Carolina.

The U.S. Department of Commerce's Industry and Trade Administration will sponsor a Computers and Peripherals Equipment Exhibition on Feb. 12-16 at the new

U.S. Trade Center in Sao Paulo, Brazil.

Tektronix, Inc. has acquired marketing rights to AD-2000 software developed by Manufacturing and Consulting Services, Inc. The software is suited for mechanical engineering applications, in particular for design, drafting and generation of control information for numerically controlled machine tools.

Randal Data Systems, Inc. has signed an agreement with Cimi Nederland B.V. of Amsterdam, The Netherlands, under which Cimi has exclusive distribution rights for Randal small business computers in The Netherlands and Belgium. Cimi's first order was for 60 computer systems to be delivered over the next three years.

Cipher Data Products, Inc. shipped its 10,000th unit of the Series 100X drives to Applied Dynamics International of Michigan.

Data Dimensions, Inc. (DDI) of Durango Systems, Inc. have entered into an agreement under which DDI will market the Durango family of small computers and intelligent terminals to large accounts and existing DDI customers nationwide.

Infotecs, Inc., a small computer manufacturer in Manchester, N.H., has received equity funding from an investor syndicate led by First Capital Corp. of Boston. Infotecs will use the new capital to expand manufacturing facilities and develop its dealer network.

Datapoint Corp. will expand its operations in the San Francisco Bay area, adding about 250 jobs principally in the engineering, production and support areas. The increasing number of orders for disk and tape drive products was cited as the principle reason for the expansion.

Ocone Associates IDM, Inc. has formed a bureau in Fort Worth, Texas, specializing in computer-aided design and computer-aided manufacturing services.

Nixdorf Computer Corp. has completed a long-term agreement that gives Informec Registered, Ltd. of Montreal an exclusive distributorship for the Entrex series of products in the province of Quebec and Federal District of Ottawa.

Scientific Components, Inc., a wholly owned subsidiary of Codi Corp., has changed its name to Codi Semiconductor, Inc. Harold Rosenberg has been named president of the company.

Honeywell, Inc. will build its Level 6 line of minicomputers at its plant in Newhouse, Scotland.

Compuscan, Inc. will ask the Securities and Exchange Commission to grant it a 20-day extension in filing the company's 10-K annual report pending resolution of questions of inventory valuation and other final accounting determinations required by its auditors. The firm anticipates the net loss for the fiscal year ended May 31 to exceed \$7.5 million.

Anticipating significant growth in the Canadian computer industry, Cipher Data Products, Inc. has appointed

Associated Test Equipment Ltd. as its exclusive representative in Canada. The company reported it had a backlog of more than 600 units for its Series 900X tape transport.

Unitronix Corp. is offering Digital Equipment Corp. microcomputers, modules, terminals and word processors.

Computer Communications, Inc. opened a regional sales office in Hingham, Mass., to cover the New England states.

Megadata Corp. has established a wholly owned European subsidiary, Megadata GmbH, with headquarters in Munich. John A. Hill, Megadata president, said the European market has become increasingly important to the company: "We have several hundred terminals on-line throughout Europe, especially in application areas such as news wire services and editorial systems."

International Mobile Data, Inc. has been formed in Vancouver, B.C., to produce mobile data terminals using technology developed under a series of contracts by MacDonald, Dettwiler & Associates, Ltd.

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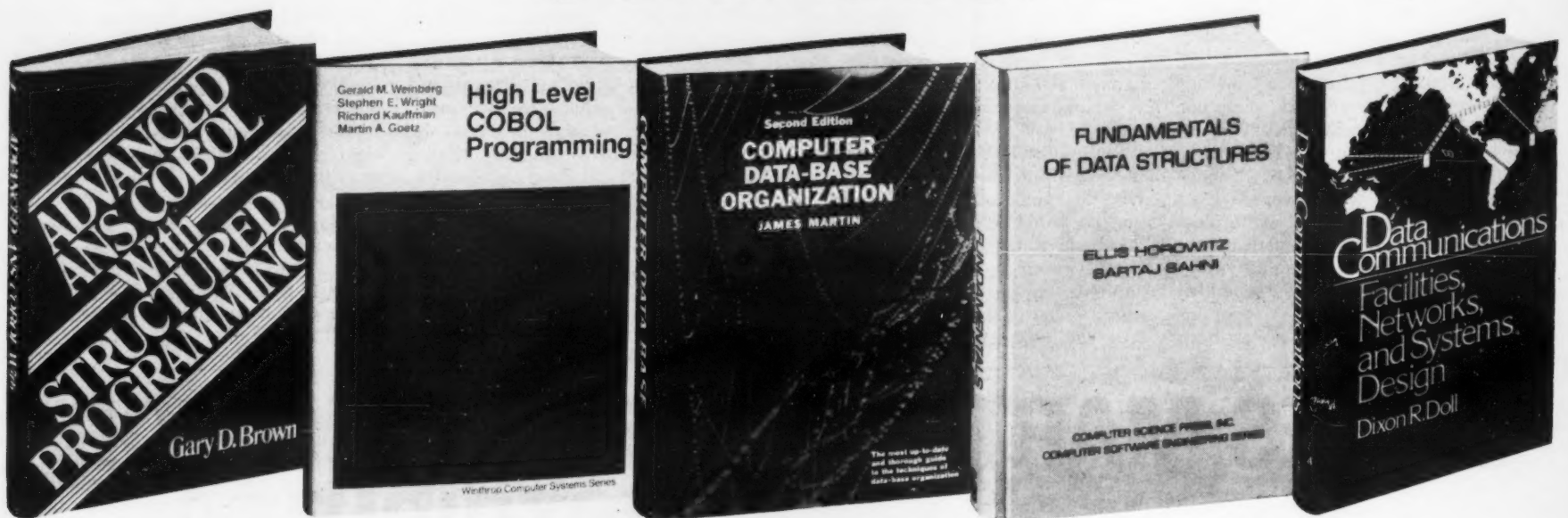
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With Access to Strategic Materials Soviets Could Control Future Electronics Mart

By Bohdan O. Szuprowicz
Special to CW

We would not have paid much attention to the linkage between strategic metals and computer manufacture if it were not for a curious item we found buried in a chapter on international trade in the 10th edition of Economics by Paul Samuelson. The famed MIT economist described an analysis of true comparative advantages of various industries in different countries that was performed by world famous economist Jan Tinbergen of The Netherlands in 1970.

According to this report, Tinbergen, using modern linear programming methods, discovered to his surprise that the USSR possesses the best mix of capital-labor resources in the industrial intensities to develop a true comparative advantage in the global manufacture of computers.

Perhaps this is why the Soviets launched their massive Riad computer manufacturing program soon afterwards, although there is no evidence they have been aware of or made use of Tinbergen's findings. What we do know is that the Soviets asked IBM to build them a factory and, when it refused, they went on developing Riad computers, designed to take advantage of IBM 360 and IBM 370 software.

Being a centralized economy firmly believing in planning development and well-versed in linear programming, the Soviets may have been

aware of their particular theoretical advantage in the computer industry before Tinbergen's discovery.

In addition, monopoly control of an industrial market consisting of at least 50,000 enterprises worth computerizing, large technically trained cadres,

magnets — were suddenly placed on an allocation basis by a leading supplier. While the price of \$6.85/lb. was held stable by primary suppliers, it never the less skyrocketed to \$13- and \$15-/lb. in transactions from stockpiles among cobalt end users.

'It was not until the recent invasion of Zaire that our attention was drawn to the importance of strategic metals to modern industry in general and electronics in particular . . . If Zaire and Zambia . . . came under Marxist domination, the Soviet bloc would control 80% of the cobalt produced in the world today.'

pressures to increase productivity and looming labor shortages must have created a conducive theoretical environment for development of a powerful domestic computer industry.

The fast-growing and captive East European market was another powerful export generating incentive, but the main attraction was the availability of the required materials within the Soviet borders.

It was not until the recent invasion of Zaire that our attention was drawn to the importance of strategic metals to modern industry in general and electronics in particular. Because of disrupted mining activities in Sheba province, supplies of cobalt — an essential metal in the manufacture of silicon carbides and high-performance

Intrigued by this rapid market reaction, we pulled out the mineral yearbooks of the U.S. Bureau of Mines to check on cobalt producing areas. Zaire turned out to be the world's largest cobalt producer, accounting for almost 60% of global supply.

But what was even more interesting was that the USSR is the second largest cobalt producer in the world, and if you throw in little Cuba, the communists control a healthy 20% of the global supply. If Zaire and Zambia, another major cobalt producer, came under Marxist domination, the Soviet bloc would control 80% of the cobalt produced in the world today.

Encouraged by these findings, we dug up the latest U.S. Joint Chiefs of Staff Military Posture Report for 1978

to find out how U.S. strategic materials supplies compare with those of the Soviet Union and China.

It turns out that while the U.S. must rely on imports of at least 30 strategic materials, China has similar problems, with dependence on no more than 15 imports. The USSR imports seven at most.

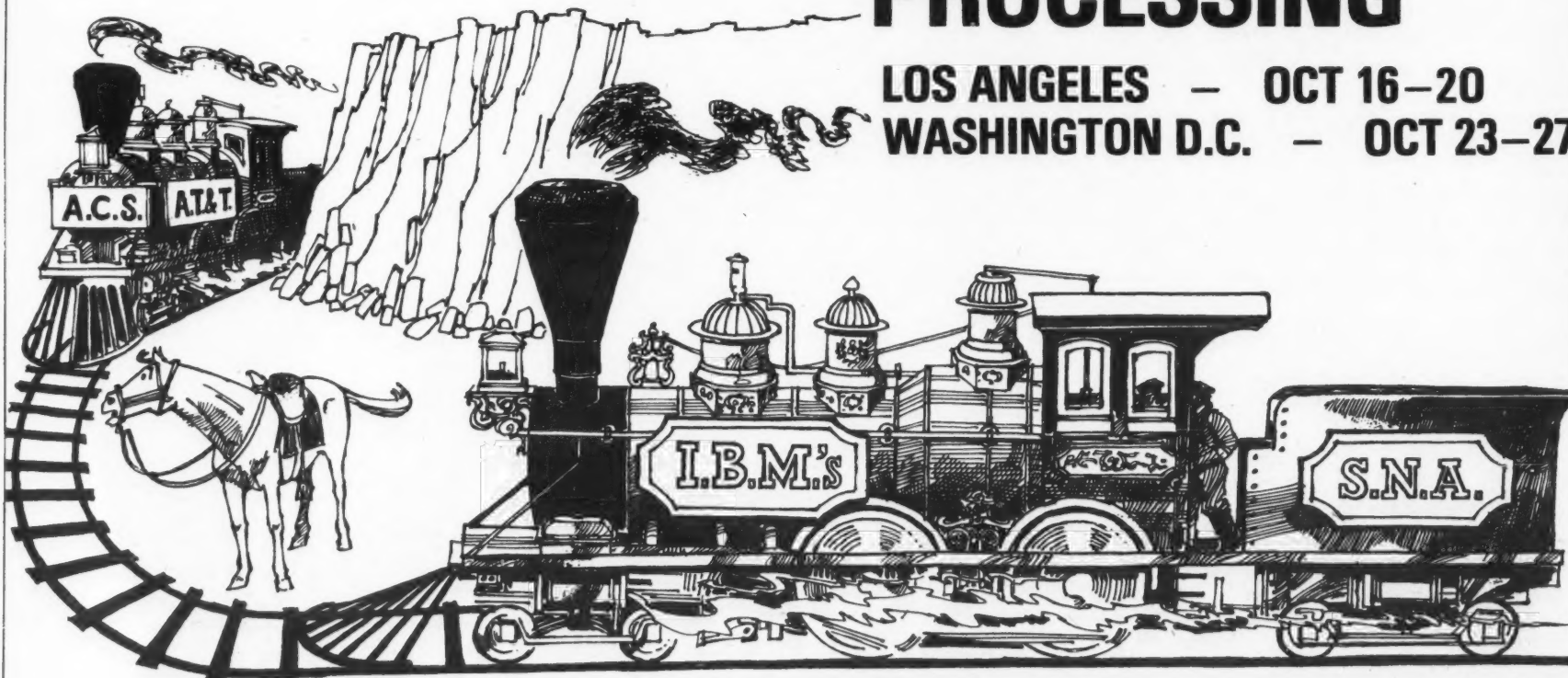
What is fascinating, however, is that exotic metals are available to the USSR within its own borders, while the U.S., Japan and western Europe depend to a large degree on imports from Zaire, Zambia, Rhodesia, South Africa and even Angola and Mozambique. In the case of germanium, indium, chromium, platinum, palladium, iridium and possibly beryllium, the U.S. already relies on some imports from the USSR and East Germany.

If one imagines a scenario in which all of southern Africa becomes destabilized and falls under Marxist control, the Comecon powers would suddenly find themselves controlling 60% to 100% of some of the most strategic materials in the world. Not only electronics, but also aircraft, missiles, nuclear weapons, steel, petrochemicals, machine tools and other crucial industries of the West and Japan could be held up for ransom economically and politically in the Opec tradition.

We do not know what the Comecon planners are really up to because it is not their style to announce their intentions.

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Despite Slip in Final Quarter CA Revenues Jump 43% in Year

IRVINE, Calif. — D.H. Methvin, president of Computer Automation, Inc., blamed CA's slippage in fourth-quarter earnings on manufacturing delays in shipments and heavy start-up expenses for the company's German subsidiary.

The company expects the earnings decline to continue into the first quarter of 1979.

For the year ended July 2, however, CA posted revenues of \$61.3 million, a 43% increase from 1977 revenues of

\$43 million.

Earnings for the year showed a 15% increase, reaching \$6.1 million or \$3.07 a share, a gain

Financial News

from last year's earnings of \$5.3 million or \$2.70 a share.

Earnings for the final 1978 quarter were \$1.5 million or 77 cents a share, down from \$1.8 million or 93 cents a share in the 1977 fourth quar-

ter.

Quarter revenues showed a healthy gain, topping \$17.7 million compared with fourth-quarter 1977 results of just over \$13 million.

Shipping delays were caused by manufacturing problems which were aggravated by defective memory components received from a major supplier, Methvin said.

The company has restructured its manufacturing organization and already has increased its order rate through its German company, he added. Total backlog is at its highest level ever, he noted.

Datametrics Reports Loss In Nine-Month Earnings

LOS ANGELES — Although third-quarter earnings slipped and nine-month earnings for Datametrics Corp. showed a loss, Garland White, president, said "results for the three-month period ended July 31 were on plan and met budgetary requirements."

Earnings for the third quarter were \$40,161 or 7 cents a share compared with \$68,518 or 16 cents a share in the same period last year. Revenues totaled \$767,755 compared with \$868,995 for the corresponding period last year.

Nine-month revenues slipped to \$2.2 million, a slight dip from the \$2.3 million revenues in the 1977 period.

The firm showed a loss of \$22,561 or 4 cents a share for the nine-month period. In 1977, nine-month earnings totaled \$185,844 or 53 cents a share. However, last year's earnings showed an extraordinary credit that brought a 20 cent a share earnings improve-

ment.

Commenting upon the results, White said Datametrics "continues to capture a high percentage of new business being developed. Research and development expenditures made in the first and second quarters relating to new programs for Rockwell International and Hughes Aircraft have resulted in the company picking up additional contracts for the Afsatcom and Firefinder systems."

On-Line Systems Earnings Up 52% In First Quarter

PITTSBURGH, Pa. — First-quarter earnings for On-Line Systems, Inc. rose 52%, netting \$475,605 or 53 cents a share compared with \$312,190 or 36 cents a share in the year-ago first quarter.

Revenues for the period topped \$6.8 million, up from \$4.3 million in the first quarter last year.

Company Record

First-quarter revenues set a company record for the ninth consecutive quarter, the company said.

The firm recently voted a three-for-two stock split, in the form of a 50% share distribution, slated for Nov. 14 for shareholders of record at the close of business on Oct. 27.

The board of directors also declared a cash dividend of 6 cents a share payable on January 12.

Expansions

Silicon Sysems, Inc. has begun construction of a 81,000 sq-ft building on Irvine Ranch in Tustin, Calif. The \$2 million facility will permit consolidation of operations now housed in separately leased facilities in Santa Ana, Tustin and Irvine, Calif.

MDS Net Gains 59% In First Quarter

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) reported a 59% increase in earnings for its first quarter. Earnings for the quarter totaled \$1.8 million or 24 cents a share compared with 1977 first-quarter earnings of \$1.1 million or 15 cents a share.

There were no extraordinary credits in the current quarter; in the year-ago first quarter, extraordinary credits totaling \$721,000, resulting principally from repurchases of debt, sent earnings to \$1.8 million or 25 cents a share.

Revenues for the quarter increased 15% to \$41.4 million from \$35.9 million in the year-ago quarter.

Ralph H. O'Brien, chairman and president, attributed the increase in revenues to end-user markets served directly by MDS in the U.S. and abroad, as well as overseas markets served by the firm's distributors.

"Orders for our Series 21 family of distributed processing systems were strong during the first quarter and continued to meet the company's targets," O'Brien said.

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In 1964 we set the pace for time-sharing.

Today, we're still way out in front!

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Seen Reason for Stock Zoom CIG Reports Quarter Net Up 55%

NEW YORK — Computer Investors Group, Inc. (CIG) had a record first quarter (ended June 30) with earnings up 55% and revenues up 26% from the first quarter 1977.

Spokesmen for the computer lessor have claimed the recent upward zoom of CIG stock was a result of its released first quarter financial results. For reasons still not clear to observers CW polled, the value of a CIG share shot up more than 700% on the American Exchange in one week of trading [CW, Sept. 4].

At press time, CIG seems to have settled in the \$4 to \$5 per share range — way up from the subdollar values posted in mid-August, but down from

the Aug. 24 peak of about \$7.88.

CIG's first-quarter revenues were \$8.5 million compared with revenues of \$6.7 million for the quarter ended a year ago. Net income after taxes and

currency, CIG noted, and a credit of \$145,000 resulting from a change in the company's method of depreciating its IBM 360 systems and related peripherals.

On June 7, CIG released its preliminary unaudited results for the fiscal year ended March 31. This release reported the year's total revenues at about \$33.8 million.

According to CIG sources, the firm has experienced a delay in finalizing its fiscal year audit primarily because of the required evaluation of its IBM 370 leases; the revaluation of its investment in a foreign subsidiary acquired in April 1977; and a delay in filing its annual 10-K report.

Financial News

an extraordinary credit of \$33,000 was just over \$1 million or 48 cents per share compared with last year's first quarter loss of \$676,300 or 31 cents per share.

Included in the net income for first quarter 1978 was a gain of \$294,000 arising from the translation of foreign

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Cognitronics Posts Results

STAMFORD, Conn. — Cognitronics Corp. reported second-quarter earnings of \$29,767 or two cents per share compared with a net loss of \$46,195 or three cents per share in the corresponding period a year ago.

The current quarter contained an extraordinary credit of \$14,000 or one cent per share for a tax loss carryforward. Revenues for the quarter topped \$1.5 million compared with second quarter 1977 revenues of just over \$1 million.

Six-month earnings were \$67,672 or five cents per share, up from a net loss of \$108,629 or seven cents per share for the first half of 1977. Revenues for the first half hit \$2.8 million, a gain over last year's six-month revenues of \$2.2 million.

Increase of 27%

William J. Lawless Jr., Cognitronics president, said the firm was pleased with the 27% increase in first-half revenues and stated that second-half revenues are expected to approximate those for the first half, with a modest increase in profitability.

Additional orders for optical character recognition (OCR) equipment used for message processing by the government provided a continuing penetration of that market, the firm said.

Currently, the company is investing in the marketing side of the business to increase the firm's share of the growing OCR and audio response sectors. "The results of this investment will be realized in 1979," Lawless said.

Lease Revenues Up 51% for DPF

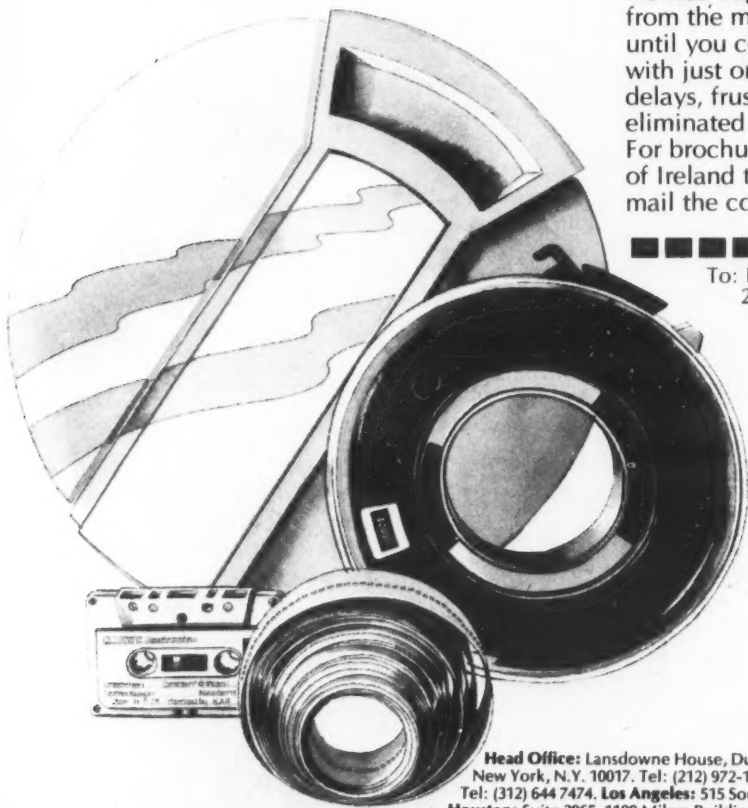
HARTSDALE, N.Y. — Although virtually all of DPF, Inc.'s 1978 earnings were generated from its wholesale baking operations, the company's computer leasing revenues increased 51% from \$25.3 million for fiscal 1977 to \$38.2 million for fiscal 1978.

Chairman and Chief Executive Officer Bertram J. Cohn attributed the gain to the IBM 370 portfolio, which includes approximately \$53 million worth of new acquisitions during the year. The company noted that revenues from 360s declined by only \$900,000 or 6.3%.

Cohn said that the leasing operation has completed an equity investor program and is about to begin a second program for placing the IBM 30 Series computers. Under both programs the firm receives a marketing fee and retains certain rights to the residual value of the equipment.

The corporation as a whole reported earnings of \$10.3 million or \$2.46 per share on revenues of \$504.9 million for fiscal 1978 ended May 31. Earnings included an extraordinary credit of nearly \$2 million for a tax loss carryforward or 47 cents per share.

Earnings for 1977 were \$5.8 million or \$1.39 a share on sales of \$464.9 million including extraordinary credit of \$604,000 or 14 cents per share.



Foreign Orders & Installations

Teesside Polytechnic in Middlesbrough, England, has ordered a Univac 1110 system valued at approximately \$1 million to provide on-line access for 80 terminals as well as for batch operations.

The UK universities of Bristol and Bath have ordered a Multics system from Honeywell, Inc. valued at more than \$3.7 million and will introduce on-line facilities for 210 interactive users, as well as remote job entry and local batch processing.

The James McEwan Group, an Australian retailing organization, has installed 240 NCR Corp. 255 checkout terminals in its 17 McEwan and eight Magnet stores in Victoria, Australia. The systems, which also include NCR 726 minicomputers in each store, provide information on all aspects of the stores' operations, including weekly gross profit reports.

A Swedish bank consortium including all commercial banks and the Co-operative Agricultural banks have ordered a Bankomat system that includes 350 to 400 cash dispensers from the Philips PTS 6000 range of automated tellers.

The Spanish Ministry of Foreign Affairs has ordered a Univac 1100/10 system valued at \$1.3 million. Among the primary applications will be information storage pertaining to personnel, international juridical organization, diplomatic and economic data, property control, accounting and library control.

The Ministry of Communications in India has ordered 215 Fujitsu Ltd. PCM-30 pulse code modulation multiplex carrier transmission equipment sets valued at approximately \$3,773. The sets will be installed in New Delhi, Calcutta and Bombay as part of an Indian plan for improving the communications networks between its major cities.

The Banque Belge Pour L'Etranger is installing an on-line system to serve its 12 branches in Hong Kong, Kowloon and the New Territories. The system includes an NCR Corp. Century 101 central processor connected with NCR teller terminals in each of the branches.

James Burrough Ltd. of the UK, a Beefeater Gin firm, has ordered a Honeywell Inc. Series 60 Level 62 system valued at more than \$166,000.

The credit federations of all the agricultural cooperatives in seven prefectures of the Kyushu district in Japan has ordered a Univac 1100/82 system valued at \$11.4 million to serve their banking requirements.

George Bateman & Son Ltd., a British brewer and hotel and pub operator, has installed an NCR Corp. system to assist with accounting.

Migros Bank of Zurich has ordered Bunker Ramo Corp.'s Bank Control System 90 to be installed in all 11 of its branch offices. The system will handle banking transactions at teller windows and in the back office.

The British Airports Authority has installed a Honeywell, Inc. Level 66 system at its headquarters near the Heathrow Airport to replace the Model 2050 used for the past five

years. The Level 66 machine will handle on-line invoicing of landing fees and associated airport charges.

Waltons Ltd., an Australian retailer, has ordered NCR Corp. 2151 point-of-sale terminals, NCR 796 CRT units, NCR 260 I/O writers and NCR 725 minicomputers which will serve as communications controllers. The heart

of the on-line system will be an NCR V-8550 system with 384K bytes of memory.

Viking-Askim A/S, a Norwegian manufacturing firm, has installed a Univac 90/60 system valued at \$1 million. The system will provide additional computing capabilities and contribute to the firm's development of

computer-based applications.

Three regional social security centers in The Netherlands, at Amsterdam, Breda and Rijswijk, have ordered three Honeywell, Inc. Model 66/05 systems. They will handle the files of 3.2 million persons who are covered by the 23 social security agencies attached to the regional center.

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Our sales people make on-line demonstrations tailored to the user's needs and can enter orders remotely right in front of the customer. We're one step ahead of the competition with our Miniterms!

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SYSTEMS PROGRAMMER

Major computer mfr. (Maine) seeks sharp systems programmer for state-of-the-art software/hardware development. Requires MVS, JES-2, VM exp. Real growth oriented co. Salary to \$27,000. (Fee paid.) Contact Gerry Battista.

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A pointed invitation to the leading professionals in the Nation to explore two areas of opportunity at the highest levels of the Computer Sciences Corporation Information Sciences Center:

COMPUTER SECURITY

There is one newly-created senior position, and several other opportunities for individuals to work closely with the top individual. The senior staff member will function initially as a consultant, operation-wide, to a number of our project leaders. Shortly thereafter, you will probably assume project management functions of your own.

Your contributions will encompass the whole question of multi-level security, including the research side as well as pragmatic applications approaches. Your understanding of hardware as well as software will be important as you delve into specifics of operating system security, data base security, access control, crypto security, penetration activities, etc.

As you are probably aware, CSC is deeply involved in a broad array of systems design and development work requiring this type of support, including some of the largest and most challenging multiple processor networks as well as extremely sophisticated applications utilizing state of the art large-scale stand-alone processors. You are likely to become involved with all of it.

Candidates for these posts should have at least five years in industry following mixed degrees in EE and Computer Science. Advanced academic work in Computer Security not required, but certainly welcomed.

ULTRA-LARGE DATA BASE MANAGEMENT SYSTEMS

We're setting out to break the state of the art in the magnitude of data base management systems, and to join this landmark effort, we're looking for top specialists with experience in designing and implementing very large data base management systems that are today at the leading edge of the technology.

Because we are dealing with a quantum jump in capacity rather than adding simple increments of size, emphasis is on the kind of professional capable of dealing with radical new concepts. A very strong orientation in information science and computer science is vital, plus a fundamental understanding of how to design and implement very large, very complex, very highly interrelated data bases. We're looking deeply into relational data bases and associative memory techniques, and are determined to advance the state of the art decisively.

You will be expected to have a good understanding of modern data base systems such as System 2000, ADABASE, MANAGE, ALADIN, IDMS, TOTAL, MAGNUM, etc., not just from the viewpoint of the user, but how such systems are designed and implemented.

The career implications of these openings are unusually promising because you will be joining a vigorously expanding operation as a top level advisor to several ongoing projects. Then, as additional programs for upcoming large data base systems begin to mature over the next few years, you will have an unparalleled opportunity to move into key technical director and program management positions.

To discuss immediate opportunities in either area, you are warmly invited to telephone Bob Zwick, Vice President, or Dr. Pete Gross, Chief Scientist at the CSC Information Sciences Center. Dial (800) 336-0429 toll free, or call collect (703) 533-8877.

If you prefer, write fully in confidence to Dr. Gross, Dept. 395.

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Major division of a growing manufacturing corporation seeks creative executive to direct the systems and data processing function. This assignment includes:

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Applicon, the leader in the graphic processing business, is increasing its lead.

Now is the time to start thinking seriously about serious, limitless growth in the industry's premier interactive computer graphics company. Presently, we are expanding our marketing, operations, and engineering divisions. The following are a few of the opportunities we'd like to talk to you about:

MARKETING POSITIONS

Director, International Sales

The job: Leading marketing and sales effort in the promotional development of the Applicon product line overseas. Major emphasis: supervision of all sales and field systems engineering activities.

The requirements: A strong background in capital equipment sales in European markets.

Manager, Training and Documentation

The job: Directing a staff of instructors in Sales Training, Customer Training and In-House Technical training as well as a staff concerned with product/application documentation for internal and promotional use.

The requirements: 3-5 years minimum experience in training and curriculum development, (sales training experience desired) along with 2-4 years electronic industry technical/marketing related experience.

Instructors

The job: Customer and software training as it relates to Applicon System use.

The requirements: 1-3 years minimum experience as an instructor preferably in the computer industry.

Marketing Manager, Architecture/Engineering

The job: Managing the marketing effort from initial analysis through all promotional activities for all products relating to architectural, engineering and drafting markets.

The requirements: A marketing-sales background in structural, piping or general drafting industries with the desire and flair to grow in a stimulating marketing environment.

Marketing Specialist, CAM

The job: Analyzing, defining and planning requirements for the manufacturing segment of the Metal Workings Industry.

The requirements: 2-4 years experience minimum including experience with the APT language in support of N/C programming or marketing experience aimed at N/C and CAM markets.

Marketing Specialist, IC/PCB

The job: Analyzing, defining and planning of requirements in IC/PCB markets.

The requirements: 2-4 years experience in the IC/PCB industries or technical design (preferably computer aided) in IC's or PCB's. Or, marketing/sales experience with a strong desire and flair for work in a brisk marketing environment.

Designers: Mechanical, IC, PCB, Drafting

The job: Positions available throughout the U.S. to work in support of sales as the technical liaison to customers during pre- and post-sale activity.

The requirements: Preferably, 1-3 years design experience on computerized graphic equipment.

Sales Persons

The job: Selling in one of a number of U.S. markets, including: Los Angeles, Pittsburgh, Boston, Hartford and the Midwest.

The requirements: A record of accomplishment in capital equipment sales is preferred.

Customer Services

The job: Performing preventive and remedial maintenance on Applicon graphic systems nationally. Specific locations include: Eastern

Massachusetts, Connecticut, Pennsylvania/New Jersey, Midwest and Wichita.

The requirements: 1-3 years minimum experience preferably in trouble-shooting PDP 11 or similar CPU's as well as standard peripheral items.

Advertising and Promotional Specialist

The job: Translating complex technical subject matter into clean, crisp promotional material and directing a full range of promotional efforts including brochures, publicity, advertising, A-V aids and trade shows.

The requirements: 3-5 years experience in the promotion of EDP systems.

Tech Writers

The job: Working with product specifications and design engineers to produce hardware and software manuals.

The requirements: Excellent writing and editorial skills, superb organizational abilities and an ability to work within deadlines.

ENGINEERING POSITIONS

Engineering Manager, Software Product Development

The job: Managing and directing the efforts of a team of engineers in the design, development, and support of software products.

The requirements: A minimum of 5-8 years strong management experience in the computer industry with a record of high achievement and leadership in a high pressure, deadline oriented environment.

Engineering Manager, CAD/CAM

The job: Managing and directing the efforts of a team of engineers in the design and development of a variety of CAD/CAM applications. You'll interface heavily with the marketing organization in leading this activity.

The requirements: A minimum of 5-8 years technical management experience with an emphasis on computer-aided design and computer-aided manufacturing including knowledge of APT programming and numerical control applications.

Application Programmers, CAD/CAM

The job: Designing, coding, testing and documenting a variety of CAD/CAM applications for mini-computer interactive graphic systems.

The requirements: Minimum of 2-4 years applications experience in the areas of design or manufacturing technology.

Group Leader, Numerical Control Applications

The job: Designing, developing and implementing numerical control applications for

mini-computer interactive graphics systems.

The requirements: Preferably, leadership or supervisory experience with a knowledge of assembly languages. You provide the N/C expertise; we'll supply the graphics.

Applications Programmers, Special Products

The job: Specify, design and develop special software products for specific customer requirements.

The requirements: A minimum of 2-4 years experience in electronics applications programming preferring knowledge of 2D/3D design techniques and an ability to deal with customers on a variety of short-term projects.

Applications Programmers, IC/PCB

The job: Designing, coding, testing and documenting a number of different applications for the IC and PCB industries.

The requirements: A minimum of 2-4 years applications experience associated with the design/development of integrated circuitry, printed circuit boards or hybrids.

Systems Programmers, RSX 11/Communications

The job: Participating in various facets of development and integration of the Applicon Graphics System with Digital's RSX 11M operating system to multiple processor systems with communications and shared memory interfaces.

The requirements: Systems programming experience involving RSX 11M operating systems and/or a background in major communication protocols is preferred.

Graphic Data Base Management

The job: Managing the graphics data base to include definition, translation and processing through to multiple processing systems.

The requirements: Preferably, experience managing a mini-computer/high performance data base. A math background desirable.

Product Development Engineer

The job: Working as an important part of the hardware support/design team. You'll design, re-design and follow up engineering of products through the manufacturing process.

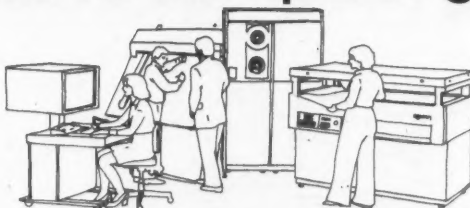
The requirements: Minimum of 2-4 years experience related to mini-computer and/or micro-computer systems. BSEE preferred.

Electrical Engineer, Color Plotter

The job: You'll design and be responsible for new design project efforts while lending engineering support for existing products related to our new color graphics plotting system.

The requirements: Preferably, a BSEE with experience in mini-computers (PDP 11 desired). Recent involvement in micro processor or system design is also desirable as is interface design experience.

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2. Call Bill Flynn collect any time during the shows at our L.A. offices: (213) 981-1525.
3. Or, send your resume to our corporate offices c/o W.W. Flynn. The address is below.

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PROGRAMMER ANALYST

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We are a major independent natural resource mining company with a solid earnings growth record. Our business is iron ore mining and processing operations, Great Lakes Shipping as well as diversification in other natural resource and energy-related areas.

If you are a project-oriented data processing professional with 5 to 7 years in design and programming of business systems in an OS/VS-1, CICS, IBM 370 Series Installation we are interested in talking with you. We believe this challenging opportunity may be especially attractive to a shirt-sleeve professional interested in a professional yet informal work climate. An appropriate college degree is preferred but "hands on" know-how is the prime requisite. The successful candidate must be available for relocation.

We are offering an excellent salary plus bonus and a comprehensive company paid fringe benefit package. In addition, our Northern Michigan location offers the advantages of a small city environment and outdoor recreational opportunities to suit every interest.

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NCR/San Diego is making the big moves.

We have room for professionals with ideas that are big enough to spawn new divisions.

THINK BIG aptly describes the way we develop and implement new concepts at this pace-setting NCR facility. We design and build large-scale computer systems — with a difference. Our bold thinking pushes the state-of-the-art to anticipate the EDP needs of business in the 1980s. That boldness leads to the kind of major developments that have twice warranted setting up company divisions for new products.

Where we're headed...

We have several major projects in work. One is our new virtual resource executive — a powerful system that combines COBOL with virtual operation. Another is a system which will provide interactive transaction processing capability for our virtual mainframes. And in the design process, we're looking for new approaches to software, firmware and testware development. On top of that, we're moving rapidly into VLSI technology with the support of NCR's own microelectronics facilities.

We're big on resources...

You need lots of high calibre equipment and technical support to take on projects of the magnitude we handle. You'll be working with our most powerful, new generation Criterion mainframes, the latest advances from our data communications divisions, a highly interactive battery of technical support specialists. And you'll have it all at hand in a plant-complex big enough to house your grandest ideas.

... but small in modus operandi

We keep our project teams small. You work intimately with a few heavyweight professionals. That means, you come to grips with more of the problem, share more of the responsibility. It also means that everyone carries his or her full weight and stands out with high visibility.

Outside — the good California life...

Our pioneering development groups are at home in Rancho Bernardo, 22 miles up the coast from San Diego. Our 114-acre hilltop location has been called "one of the 10 best-designed facilities in the nation." You'll be in the midst of California's finest recreational facilities, including 70 miles of beaches from San Juan Capistrano to the Mexican border. You'll work where others come to vacation.

WHAT'S NEW AT NCR?

NCR is on the move. We've mounted a major, coordinated effort, backed by ample R&D resources, to emerge up front in 1980s EDP. For example: VLSI technology, distributed network architecture with interactive transaction processing and important new functions, advanced communication and I/O protocols, high-level PASCAL-based language, powerful new virtual systems, and advanced concepts in micro-processor-based terminals.

Immediate openings in many areas

If you have an engineering or computer science degree (or equivalent) and a year or more of experience in one or more of the areas listed, contact us at once.

Immediate Openings — Software areas:

- Distributed Network Architecture
- Transaction Processing
- Interactive Processing
- Data Base Design
- Performance Measurement & Analysis
- Configuration Management
- File Access Methods
- Operating System Development
- Compiler Design/Development
- Firmware Development
- Diagnostic Programming
- Test Systems Development
- MICR Proof Of Deposit Software
- Systems Architecture
- Tools Support
 - time-sharing
 - compiler designs/developments (high level block structured languages)
 - SW tools design

Immediate Openings — Hardware areas:

- Design Automation Engineering
- MICR/OCR/OMR Engineering
- Memory Device Engineering
- Logic Design Engineering
- Systems Architecture
- I/O Subsystem Configuration
- Systems Integration Test
- Product Engineering—Mechanical, Optical, Electrical

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Seven years ago we were a small group of intensely dedicated people with an idea we were convinced would work. Today, we've grown to an intensely dedicated 2500 people. Our revenues have doubled. And redoubled. To a record \$188 million in 1977 and to over \$137 million in the first half of 1978. And we're still surging ahead with strategies and concepts we're convinced will work.

We need people to fit into our pioneering workstyle. The type of

people who can think creatively. And carry out their ideas to fruitful completion.

If you're the right kind of person, perhaps you should talk to us. Amdahl could be the right place for you.

The following positions represent some of our more immediate needs at our headquarters in Northern California. Qualified candidates are invited to direct their response to Employment Department, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

DIAGNOSTICS/SMALL SYSTEMS

DIAGNOSTICS ENGINEERS

We seek Diagnostics Engineers at all levels to share in our commitment to state-of-the-art diagnostics. You will design, develop and maintain diagnostic systems software for Amdahl's large-scale computers. You are a professional with experience in high level language programming, knowledge of logic design and large computers, and the ability to work with large and mini systems. Please indicate 435-E on your response.

SOFTWARE INTEGRATION ENGINEER

You will be working closely with both developers and users in software reliability testing and integration of hardware diagnostics or minicomputer control systems programs. You should have knowledge of and experience with most of the following: computer organization, logic design, minicomputer control systems, software reliability, higher level and assembly languages. In addition, you should have a BS or MS in Computer Science, or the equivalent, and at least 2 years' related experience. Please indicate 425-E on your response.

REAL-TIME SMALL SYSTEMS PROGRAMMERS

You will be responsible for the design, development and maintenance of sophisticated test systems and diagnostic subsystems. Knowledge in one of more of the following areas is desirable:

- NOVA minicomputers
- Real-time operating systems
- Programming language development
- Interactive utilities
- TSO and JCL
- RDOS

You should have a BS or MS degree in Computer Science or EE, or the equivalent experience, and at least 2 years' applicable work experience. Please indicate 451-E on your response.

DESIGN AUTOMATION SYSTEM/APPLICATIONS

DESIGN AUTOMATION ENGINEER

Our design group is developing an integrated DA

system for the design and implementation of state-of-the-art computers. This development effort has created challenging positions in the areas of DA data base and system control, simulation, verification and analysis, physical design fault test generation and design documentation. Candidates should have one or more degrees in EE/CS, or the equivalent experience, and experience with MVS or VSAM is highly desirable. If you feel you can contribute in these DA areas and are interested in joining our development team, we'd like to talk with you. Please indicate 427-E on your response.

DESIGN ENGINEERING APPLICATIONS PROGRAMMING

We seek individuals who are interested in computer design engineering applications programming. You should enjoy using and have a good working knowledge of higher level languages (preferably PL/1 and FORTRAN), working in teams and interaction with software users. This is an excellent opportunity for you if you seek a variety of responsibilities, software activities and challenging problems. A BS in Computer Science or the equivalent engineering applications programming experience is also required. Please indicate 439-E on your response.

SOFTWARE ENGINEERING

COMPILER WRITER

You will be joining a programming team responsible for engineering compilers and assemblers. This is an opportunity to apply your compiler maintenance and development experience to new development. In addition to your involvement with our programming teams you can expect to use and refine rigorous software engineering methods and an opportunity to develop compilers and compiler building tools. A background that includes competence in using tools such as YACC, LEX, LALR and AED will be considered an important plus. Please indicate 438-E on your response.

SOFTWARE ENGINEER/DEVELOPMENT TOOLS

This is an excellent opportunity for experienced programmers who have a vital interest in programming technology. You will join other software engineers in the definition and implementation

of an integrated set of tools for software development. You should have experience in the following areas: interface with computers, specification and design techniques, compilers, data bases, automatic testing and debugging tools, and simulation of computer hardware and software. Above all, your most pertinent experiences will be those contributions you have made to improve the programming technology used by yourself and your colleagues. Please indicate 438-E on your response.

LOGIC AND SYSTEM DESIGN ENGINEERS

SYSTEM DESIGN ENGINEERS

You will be responsible for design work in the console area which is the main controlling element of Amdahl's 470 systems. You should have 2-4 years' experience in peripheral controller design or small systems and a BSEE. MS preferred. Please indicate 420-E on your response.

MAINFRAME DEVELOPMENT ENGINEERS

We seek individuals with an aptitude for defining the workings of complex computer systems and who are competent in gate level logic design. The positions immediately available entail the development of the following: sophisticated cache storage systems, high performance pipelined CPUs, exotic arithmetic algorithms, and innovative I/O processors. These opportunities will enable you to become familiar with 370 architecture, large-scale computer organizations, high speed, super dense logic circuitry, microprogramming and simulation programming. Please indicate 424-E on your response.

MEMORY DESIGNERS

Several openings exist for experienced memory designers who will assist in the design and support of large high-speed memories for Amdahl's growing computer family. You should have a BSEE or an advanced degree with 1-5 years' experience in memory design or support. Your background includes a familiarity with both MOS and bipolar technologies. Experience with ECL design and interfaces to large CPUs is very desirable. Please indicate 424-E on your response.

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PROGRAMMER/ANALYSTS

*The President and Staff of
Software Design Associates, Inc.
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Luncheon 1pm
or Cocktail Hour 5-7pm
at New York City's Finest Hotel
Thursday, September 21st*

RSVP ONLY PLEASE
Call 212-686-2032 for reservation

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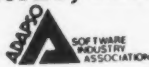
We look forward to meeting you personally on Thursday, September 21st (RESERVATIONS ONLY THAT PARTICULAR DAY PLEASE). If you can't join us, please send us your resume and we'll arrange for an immediate convenient interview.

Jay Goldberg, President

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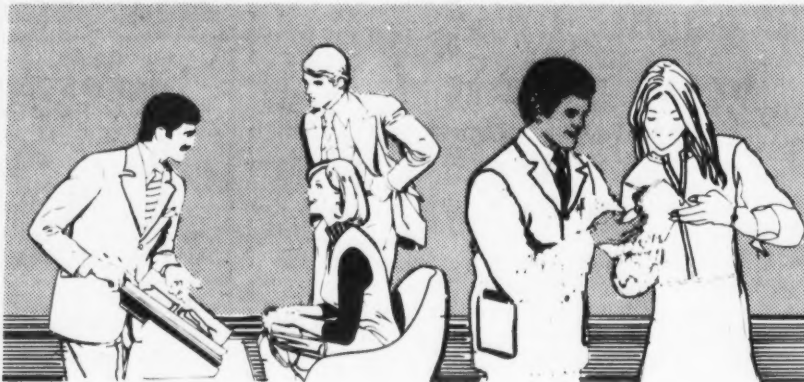
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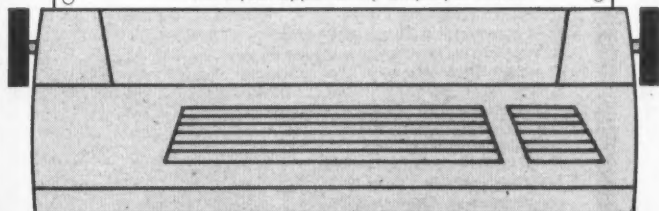
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MIDDLE GEORGIA

We have the immediate need for a Programmer/Analyst with Property and Casualty Insurance experience.

If your background includes BAL, COBOL, CICS, DL/I and DOS/VS, we can offer you a rewarding career and the perfect environment for your family.

Good salary and company benefits, including relocation expenses.

CW Box 1680
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Immediate requirement for a computer systems customer engineer with programming/systems experience or a computer systems programmer/analyst with hardware maintenance experience who would like to learn and live with a fantastic new retrieval system. We need a self starting take charge individual to learn both the hardware and software aspects of our new system and maintain the technical interface between the company and customer. Home office is located in central New Jersey. Salary commensurate with experience plus an excellent overall benefit program. Please send detailed resume stating current earnings to our Director of Employment.

CW Box 1682
797 Washington St.
Newton, MA. 02160

An Equal Opportunity Employer M/F

PROGRAMMER ANALYST

To assist in the design and implementation of a clinical information system. Knowledge of Fortran, PL/I and file management concepts required.

Send Resumes to:
DR. M. SHAKUN
School of Dental Medicine
SUNY at Stony Brook
Stony Brook, N.Y. 11794
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Knowledge of Digital PDP 11 Architecture and RSX-11M Operating System Experience with Fortran, Macroassembler.

Responsibility for daily operation of DP department of major New York based Magazine Publishing Company.

Send resumes with salary requirements to:

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Chicago/Midwest Field Service

Manufacturer of computer tape and disk packs seeks a well-rounded technical support person. Candidate must have experience with tape and disk drive, as a former hardware field engineer. Should be strong on human relations and understand the need and priorities of our clients. Competitive salary, benefits and car allowance. Contact Gary Glenner, Regional Manager, BASF Systems, 1800 North 30th Ave., Melrose Park, IL 60160, (312) 343-6618. Equal opportunity employer m/f

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CYBERTEK, the leading computer software firm specializing in on-line systems for the Life Insurance industry, is looking for aggressive data processing professionals to fill several openings. We need ambitious and talented people, who are interested in a successful career with a leading company.

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Programmer/Analyst positions which involve providing customer support in a consulting capacity for either facilities management or software purchase clients. Applicants must have 2-5 years Assembler and/or COBOL experience on either IBM 360 or 370 systems and have a solid record of accomplishment. Must be able to accept challenge and operate in a variety of environments including OS, DOS, IMS, VS, and CICS.

PROJECT LEADERS

Project lead positions which involve coordinating the activities of technical personnel and assisting the Account Manager with administrative duties. Excellent career paths exist into higher levels of management. Applicants must have 4-6 years of data processing experience including 1-2 years in a project leader position. Strong analysis skills a must; programming skills in COBOL and/or BAL desired; life insurance experience a plus.

If qualified, call or send your resume to:

CYBERTEK
Computer Products, Inc.
3150 Doolittle Drive
Northbrook, IL. 60062
(312) 564-7050

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Programmers, Analysts, Software Specialists

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We can put you in touch with openings from coast to coast regardless of geographic preference. Contact the nearest NPA affiliate listed below for confidential service. All fees employer paid.

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4720 Montgomery Ln. #503
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(301) 654-9225

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(213) 986-4400

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Exton, Penn. 19341
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(215) 363-1600

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Milwaukee, Wis. 53203
(414) 278-7800

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Suite 206
Los Altos, Calif. 94022
(415) 941-3200

CRETNEY & ASSOCIATES
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Cleveland, OH 44115
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Qualifications:

1. BS in business, mathematics, computer science, or work equivalent — a must
2. ANSI COBOL — a must
3. Knowledge of Burroughs or Sycor — a plus
4. Familiarity with MSA accounting packages — a plus
5. Experience in any of the following fields; freight brokerage, air freight, insurance, mortgage banking, travel agent inventory control — a plus

history/requirements to:
Mike Dethlefs, Dir.
Fritz Data Processing Services
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 215-565-2920

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Data Processing Management Consulting

Expanding International Big 8 CPA firm seeks computer system professionals for openings in New York, Boston, Washington, Cleveland, Atlanta, Chicago, Kansas City, Los Angeles, San Francisco, Houston, Dallas and other U.S. offices. Skills in two or more of the following areas are required:

- Evaluation and selection of hardware and software;
- Systems feasibility and cost/benefit studies;
- Operations, security and control evaluation;
- Project management/quality control of development projects;
- Computer performance evaluation;
- Minicomputer evaluation, selection, and installation
- Data base management systems
- EDP auditing
- System design and installation
- Telecommunications

Qualified individuals must possess B.S. degree (Master's degree desired), up to five years recent in depth technical data processing experience, strong skills in oral and written communications, programming and/or system analysis. Travel required depending upon location. Salary in the \$17-35,000 range.

For an outstanding career in management consulting, submit resume including salary history and geographic preferences to: Dept. CW C/O M. Levin, 38th Floor, 345 Park Ave., New York, N.Y. 10022. EEOM/F

PROGRAMMER

Internal growth within the Information Systems Group of Rockwell International has created the need for a programming specialist at our Eastern Computing Center in Pittsburgh, Pa.

If you have 5-7 years experience in implementing, maintaining and modifying IBM's S/VS or MVS operating systems and background in ASP, JES2, JES3 or HASP in an RJE environment you could have the opportunity to progress in a highly sophisticated environment.

The Ideal candidate will have a BS Degree with hardware experience on large scale IBM 360/370 computers, telecommunications hardware, VTAM/NCP/VSAM, IMS, TSO and IBM assembler language, Cobol, Fortran or PL-1.

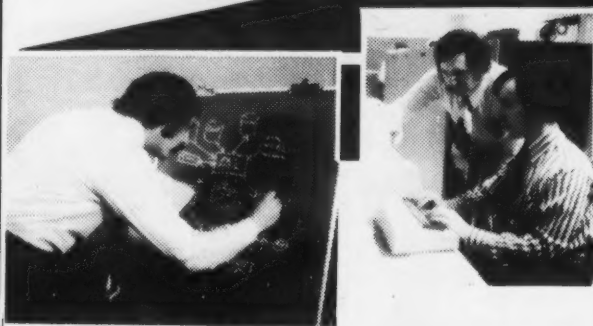
We offer a liberal benefits package and competitive salary.

If your background meets the above requirements and you would be interested in exploring employment opportunities with Rockwell International, send your resume including salary requirements in complete confidence to J.A. Hollis, Personnel Representative (PB-38), Rockwell International, 600 Grant Street, Pittsburgh, PA 15219. Minorities, women and handicapped are encouraged to apply.



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...exploring exciting, new developments in hardware/software technology and putting it to work in a vast array of highly specialized and complex business systems. The advent of CICS and IMS applications represents another bold step forward and has created exhilarating career challenges in all phases of data processing for professionals with the insight necessary to respond to innovative concepts.

IT'S HAPPENING TODAY AT SPR... we're laying the groundwork for the complex business systems still on the horizon. Backed by a national reputation for excellence in computer consulting, based on a unique team approach to on-site project assignments and supported by a staff of data processing professionals, we've established an astonishing record of growth and success. Working in close coordination with management and systems staffs of the country's top corporations, SPR has played a vital role in advancing automated systems technology to the state-of-the-art.

Opportunities Are Opening-Up Across The Country...

...accelerating demand for our professional services coupled with an on-going policy of promotion-from-within has created immediate opportunities with both our marketing and technical consulting staffs. We now have branch offices in a number of major metropolitan areas throughout the country and plan more branches in the next few months.

Join Our Technical Consulting Staff...

...our phenomenal growth has produced open-ended career opportunities for talented Programmers, Programmer/Analysts and Consultants. As a technical representative of SPR, you'll be actively involved in all aspects of data processing with assignments ranging from new business systems development and start-ups to system modification and switch-over projects.

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...whether you're experienced in software sales or a professional in DP management with a strong interest in sales — you'll find SPR can provide you with a sound base for a successful career in sales and marketing. Recent promotions to the branch management level have resulted in exceptional opportunities and promising potential for advancement and increased financial rewards.

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Call Collect
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9AM-5PM C.D.T.

If unable to call, forward a resume to Le Roy Braun, (Technical Staffing) or Chuck Erikson (Marketing Staffing) at:

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 Dpt C/5401 W. Kennedy Blvd.
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 Tampa, FL 33609
 (813) 872-2631

Programmer Analyst

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Major publishing company (Fortune 1000) has immediate opening for programmer/analyst to develop sophisticated interactive marketing information system for large division. You'll have complete charge of new 192 KB installation operating under RSTS-E (CTS 500). Responsibilities will include some supervision of programming by non-staff personnel. Position offers strong growth potential. We require at least 2 years background in programming business applications. Experience with DEC software a plus. Salary commensurate with experience. Excellent benefits. Send resume, including salary history to: Mr. Donald Caldwell, Personnel Department.



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SYSTEMS**ANALYSTS/PROGRAMMERS***** San Diego ***

Our progressive Information Systems Department has several interesting career opportunities for analysts/programmers who are innovative, yet practical and productive.

You may qualify for one of these positions if you have at least 3+ years experience designing and implementing manufacturing applications on medium to large scale computers and knowledge of COBOL and DOS/OS-JCL, and experience using structured programming techniques. Experience with on-line data base management systems would be a plus.

Responsibilities include designing and maintaining both batch and on-line COBOL applications. Heavy manufacturing experience desired. Must be capable of understanding the overall manufacturing systems. The Data Center support is an IBM 370/145 and 370/148 (3031 Oct. delivery) with an over 100 terminal on-line CRT network using OS-VS1, CMS, VM/370 and IMS DB/DC.

National Steel and Shipbuilding Company is one of San Diego's largest commercial employers, located in Southern California's greatest recreation center. San Diego offers a year-round climate in which to enjoy golf, tennis, bicycling, ocean and mountain sports, or whatever outdoor activity you enjoy. In addition to this ideal lifestyle, our company offers competitive salaries, an outstanding compensation package and generous fringe benefits.

We would appreciate the opportunity to review your resume. Please send it to D.W. Shuett, National Steel & Shipbuilding, P.O. Box 89278, San Diego, Calif. 92138. We are an equal opportunity employer M/F.

**National Steel
& Shipbuilding**

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MANAGEMENT SCIENCE ANALYST — B.S. degree in Math/Statistics with 3 or more years experience with IBM 370 Computers, Data Base software and applications. CICS/VSAM/DLI or Total, IDMS desirable.

SENIOR SYSTEMS ANALYST — 3-5 years experience as a systems analyst including DOS/POWER/VS; ANS COBOL; DATA COMMUNICATIONS/DATA BASE (CICS). Specific experience as a project leader in insurance data processing required. Property and casualty (premium accounting and claims processing) desirable.

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Morrison Incorporated

Human Resources Department
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205/432-9711 Extension 263



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(301) 652-1960

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We need you if you have one or more years of teaching experience, two to four years of data processing experience on large scale IBM systems and, above all, the ability to communicate DBMS concepts.

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Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

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Mrs. Donna Koterba

Data Technology

6611 Kenilworth Ave., Suite 413
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Toll Free 800-638-0911

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Si

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Whether or not you are actively seeking a new position, you may recognize that your ability to grow is constrained in your present environment. At Amdahl, we think you'll find opportunities for personal recognition and advancement, and a unique spirit of challenge. We are specifically seeking individuals for the following position at our modern Sunnyvale headquarters where you will enjoy a stimulating cultural and social environment as well as the hospitable year-round climate of Northern California.

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You will be joining a progressive staff converting to VM Release 5.2 and VM/SE. You will be responsible for the generation, modification, maintenance and tuning of VM. This includes CP, CMS, EDGAR and PROGRAM PRODUCTS. You must have extensive knowledge of CP internals, performance measurement and tuning experience and 3-5 years of experience in VM internals.

Qualified candidates are invited to respond by indicating 753-E on their letter or resume and directing it to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

amdahl

•SYSTEMS ANALYSTS •PROGRAMMERS

Due to company growth, Unistrut Corporation has career openings in the following areas:

- Manufacturing & Financial Application
- Mini-Computer Applications

Minimum of one year experience is desirable. Excellent salary commensurate with your experience. If interested in these positions, please call, or send your resume to:

Jim Hickey, Data Processing Manager
(313) 721-4040

UNISTRUT CORP. A subsidiary of GTE
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Wayne, Michigan 48184

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CORPORATION**

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EDP SPECIALISTS

career search opportunities
\$18,000-\$50,000

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East Coast "Fortune 100" corp req's BS/BA w/exposure to IMS Internals, troubleshooting systems & directing users. Exp with BAL and Tele-processing Access Methods a plus. Refer RM.

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"Fortune 500" firm, due to continued growth, currently has opportunity available for sev EDP Auditors w/2+ yrs exp. Past System/Programming bkgd preferred. Full career benefits. Refer JS.

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FOR FURTHER INFORMATION ON EACH OF THESE FEE-PAID POSITIONS, CALL OR SEND RESUME TO THE RECRUITMENT SPECIALIST NEAREST YOU:

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ATLANTA, GA 30346 — R. Spang, 47 Perimeter Center, (404) 393-0933
BALTIMORE, MD 21204 — R. Nelson, 409 Washington Ave., (301) 296-4500
CHARLOTTE, NC 28202 — J. Schwab, 1742 Southern Nat'l Ctr., (704) 375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Road, (216) 749-6030
FORT LEE, NJ 07024 — R. Mansfield, 2125 Center Avenue, (201) 947-6920
MCLEAN, VA 22102 — G. Nugent, 7921 Jones Branch Drive, (703) 790-1335
NEW YORK, NY 10036 — W. McNichols, 1211 Ave. of the Americas, (212) 640-6930
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PRINCETON, NJ 08540 — R. Davis, 3490 U.S. Rte. 1, (609) 452-8135
WILMINGTON, DE 19810 — G. Whitwell, 3411 Silverside Rd., (302) 478-5150
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Openings are presently available in the following areas:

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- Houston
- Atlanta
- Washington, D.C.
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Ms. Marion H. Widows
Martin Marietta Data Systems
300 East Joppa Road
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MARTIN MARIETTA

MARTIN MARIETTA DATA SYSTEMS

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We are developing real time, high volume transaction processing systems which must have both high performance and exceptional reliability. We are looking for senior programmers (3-5 years real time experience) who wish to be involved in such projects.

Individuals with experience in minicomputer based real-time systems, particularly with multiprocessor configurations, or with communications systems using microprocessor based terminals, will find these positions challenging.

We provide a working environment which encourages professional growth. We are located adjacent to a major university and convenient to large metropolitan centers in the Middle Atlantic states.

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- Product Repair Center Manager

SOFTWARE DEVELOPMENT

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- Language and Compiler Specialist
- Systems Utility Specialist
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MINI SYSTEMS GROUP

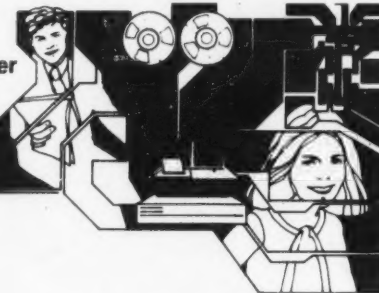
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LARGE SYSTEMS - SYSTEM 400

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Computer Products Group

AN EQUAL OPPORTUNITY EMPLOYER M/F

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Long Island based company seeks individual prepared to meet the challenge of a major upgrade in application development. Requirements: 2-3 years experience programming COBOL for NCR systems. Knowledge of B3 operating system desirable. The successful candidate will enjoy excellent salary and working location with above average benefits. Send resume with references, salary history and requirements in confidence to: Corporate Director of Data Processing, Parklane Hosiery Company, Inc., 1540 Union Turnpike, New Hyde Park, N.Y. 11040.

Mini-Computer Programmer

PDP 11/45 7/32, 8/32 DG NOVA SEL 32/55, HP 3000, Honeywell Level 6 H 716, Two years exp. Req. Suburban Virginia & Md. locations. U.S. Citizenship req. \$17-23K. Relocation Pd. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101 Tel (703) 356-1997. Other positions avail USA & OS.

SYSTEMS CONSULTANT

Multi-div. ind. expanding internal corp. consulting div. Individ. w/min. 5 yrs. of broad mfg. exp. interfacing at exec. level, qualify for 3 openings. Travel required. Salary to \$33,000. Contact Stan Durbas. (fee paid).

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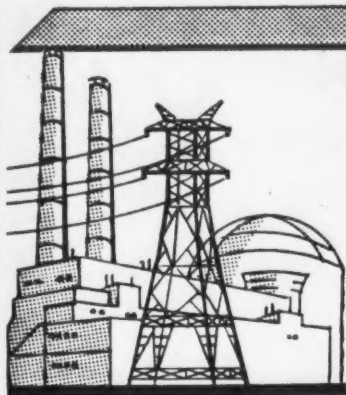
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We have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budget, within specifications, you may like the challenges.

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We need an experienced person in business methods and procedures to assume a responsible position in our Management Information Systems Group. Responsibilities will include Methods, Procedure Writing, and Field Training. Applicants should have five or more years of experience in methods work and procedure writing for computerized business systems. A proven leadership record with verbal and written communication skills in a demanding environment is essential.

Please apply in writing with educational, employment and salary requirements to:

Mrs. Linda M. Heidenis

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• DATA BASE ADMIN \$35K

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• PROJECT MGMT \$28K

Prestige firm with state-of-the-art hardware wants sharp technical Project Mgr. Must be multi project oriented, have admin skills & have managed staff of 7 or 8.

For information on these & other career positions, please call or send letter/resume in confidence to:

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Systems Analysts & Programmers

TEXAS GULF COAST AREA

Intermedics, Inc., a rapidly expanding manufacturer of Cardiac Pacemakers is looking for analysts and programmers for its Freeport, Texas operations.

Current positions require 2 years or more experience with any DEC PDP11 series computer. RSTS/E operating systems a must.

Experience with Univac and Microdata would be useful.

If you would be interested in one of these challenging positions and would like to live in the sunny south, send a confidential resume to: Personnel Manager



Intermedics Inc.

P.O. Box 617, Freeport, Texas 77541
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PROGRAMMER ANALYST

Our Rocky Hill, Conn. based retail chain, operating 72 stores throughout New England and the mid-Atlantic states, seeks an individual with 3 or more years hands-on experience in programming and systems development. A working knowledge of ANSI-COBOL and JCL in addition to exposure to RPG and POWER a plus. Being conversant in retailing or distribution would be a plus but not necessary.

In addition to full company benefits we offer a starting salary commensurate with your experience. For immediate consideration send resume or letter outlining work and salary history and requirements to: Vice President, Data Processing.

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Major New Jersey bank is seeking a Sr. EDP Auditor with 2-3 years' experience including COBOL and a working knowledge of JCL in a DOS or OS environment.

We offer an excellent salary and benefits package. Please send resume with salary history to: Personnel Manager, UNITED JERSEY BANKS, 210 Main Street, Hackensack, New Jersey 07601. We Are An Equal Opportunity Employer M/F.



United Jersey Banks

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Interdata Division

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Successful applicant will have a
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Software/ Analyst

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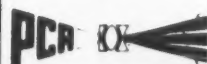
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We are seeking an experienced Planning Specialist for our Corporate Information Services Organization. You will have full responsibility for preparing and updating the five year plan for Information Services. This will include hardware, software and staffing requirements necessary to support the corporation's growing computing needs. Development of short term action plans to meet long range goals and monitoring and reporting of actual accomplishments against plans will also be necessary. You must have 8-10 years' experience in all facets of data processing in a large, third generation computing environment and strong planning and administrative skills. Extensive knowledge of hardware and software characteristics of 370/168 or Amdahl 470V/6 systems is desirable. Please indicate 754-E on your response.

Qualified candidates are invited to direct their response to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

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Knowledge of Burroughs B6700, COBOL, and DMS II required

Simmons Company, a leader in the bedding industry, is currently seeking a few select, very talented professionals to assume key positions in new information systems development. You must have at least 2 years experience on Burroughs B6700 or above, with an excellent working knowledge of COBOL and DMS II. We prefer individuals with Bachelor degrees in Computer Science or Business Data Processing. On-line experience is highly desirable. We offer competitive compensation, generous fringe benefits including a bonus, and a working environment in which you can make your ideas grow.

For immediate attention, send resume in confidence to Mr. Drew Schrader.



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404-449-5000

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MEDICAL INFORMATION SYSTEM DEVELOPMENT PROGRAMMER/ANALYST

A Research Institute at the Indiana University Medical Center (Indianapolis) is seeking a bright and dedicated Programmer/Analyst to join in the development of a medical information system with national significance. Work involves networking, transaction processing and the development of an in-house data base system and an automated medical decision-making system. Applications extend to the clinical lab, the pharmacy, the medical record and the operation of the medicine clinics. Opportunity for strong interaction with users and responsibility for major application systems from design through implementation.

Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11 RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

Salary depends upon qualifications and experience. Please send resume (if possible, transcript) to Mrs. Joanne Lepper, 1001 West 10th St., Indianapolis, Indiana 46202.

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Send resume to Personnel Department, County Government Center, 3301 Tamiami Trail East, Naples, Fla. 33942. (813) 774-8338. An Equal Opportunity Employer

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Employee Relations Manager

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Pacific Northwest

Distributed Processing

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Executive Resources, Inc.

RSTS/E

PROGRAMMERS

We are in the midst of expanding our D.P. staff and are seeking experienced Basic+ programmers. We need self-reliant individuals with 1-4 years programming experience using the RSTS/E operating system preferably in a commercial environment. Please send your resume including salary history and requirements in confidence to:

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Data Processing Dept.
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We are seeking results oriented professionals to perform EDP feasibility and other consulting services for clients ranging from less than \$1,000,000 to \$50,000,000 in sales.

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The positions are located in Hawaii (and we have one in Micronesia for someone who wants to go to the South Pacific!!)

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Systems Programmers

Openings in our Berkeley R&D Center

Datapoint has become the leading manufacturer of distributed data processing systems. To support our continuing rapid growth, we are expanding our Western Development Center in Berkeley, California creating openings for highly qualified Systems Programmers in the following R&D groups:

- * DATA BASE MANAGEMENT
- * SYSTEMS DEVELOPMENT
- * COMPILER DEVELOPMENT
- * COMPILER PERFORMANCE OPTIMIZATION

Applicants should have participated in the design and/or implementation of a system in one of the above areas. Assembly language experience is essential.

Our development projects are oriented toward supporting Datapoint's new network architecture, processors, and peripherals with a strong emphasis on high quality software systems.

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DATAPoint CORPORATION

The leader in dispersed data processing™



Director of Operations NYC Location

We are an international financial diversified firm noted for being a leader in our industry. We currently seek a Director of Operations for our NY data center. Qualified candidates must have a minimum of 5 years data processing experience which should include some systems analysis and programming as well as a minimum of 2 years operations management.

Candidates must have a thorough familiarity with 370 hardware in both a DOS/VS and OS/VS environment. This position will report directly to our executive VP and involves the supervision of 70 people in our software, operations and keypunch areas.

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We have been retained by a prominent international organization to recruit 8 high calibre software professionals for their new Advanced Systems Development Group. These individuals will be part of a top notch team involved in state-of-the-art development work for their world-wide computer network using IBM's most advanced hardware and software.

A sample of current projects include:

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- Computer Performance & Capacity Measurement

Our client offers an exceptional opportunity for long term career growth in a stable but rapidly expanding environment. Management is both responsive and technically capable. They offer highly competitive compensation (\$20,000-\$35,000) with solid future earnings potential and clearly developed career paths in both the technical and managerial areas. They are situated in a pleasant suburban location near a major city and varied recreational areas.

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SOFTWARE ENGINEERS

JOIN THE PROs AT SDC!

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Command and Control/Intelligence Systems Technology

- Hands-on experience with DEC 10 and PDP 11 on-line systems
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SDC offers a benefits package that compares with the best. For example:

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System Development Corporation

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A strong programming and software implementation background and experience in communication software will qualify you for programming positions within our Networks Development area.

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If you have knowledge of compiler theory and construction and a working knowledge of assembly and higher level languages, we want to consider you for positions in our Common Code Generator, Common Library and BASIC and FORTRAN compiler projects.

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If you are an experienced O/S programmer, consider developing software for the STAR 100, one of the largest and most advanced virtual memory and string array processing computer systems in the industry today. Positions involve detailed design, implementation and documentation of new STAR O/S features and improvements. A working knowledge of FORTRAN and an Assembly language are required.

Control Data offers a challenging and rewarding work environment and with us you will receive recognition and technical growth. We provide excellent compensation and comprehensive benefits, including dental and retirement plans. Qualified candidates are invited to send resumes, stating position or preference and salary history/requirements (only those resumes with salary history/requirements will be considered) to Karen Hardy, Dept. 50A, 215 Moffett Park Drive, Sunnyvale, CA 94086. (408) 734-7434.

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An Affirmative Action Employer M/F

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Credit Bureau, Inc. of Atlanta has several positions immediately available for experienced Data Processing personnel. CBI has a nationwide on-line teleprocessing network running in an MVS, CICS/VS environment. Only those persons interested in joining a very aggressive growth oriented, leading edge organization dedicated to professionalism need apply.

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PROGRAMMERS

Must have 3-5 years' experience in CICS/VS, MVS and on-line systems knowledge a real plus. Must know ALP.

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Must be experienced in MVS, OS Assembler, BTAM, TCAM. Must have knowledge of IBM equipment, Comtem equipment and teleprocessing experience in monitoring and support of an on-line system. Salary commensurate with experience. Unlimited opportunity for personal growth and advancement. Excellent company benefits. Send complete resume including salary history and requirements to:

CBI Corporate Headquarters
Division of Equifax, Inc.
J.W.F. - Corporate H.R.
P.O. Box 4081
Atlanta, GA 30302

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PROGRAMMERS/ PROGRAMMER ANALYSTS DALLAS, TEXAS

Our client is a rapidly expanding company with numerous programmer and programmer analyst positions available in Dallas, Texas. Due to this rapid growth, there is an on-going need for quality computer professionals.

Candidates should have a minimum of one or more years of experience in COBOL programming and systems analysis on IBM mainframes. All application backgrounds are being considered.

Client offers excellent benefit program and paid relocation.

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John R. Weitzel

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Carillon Tower East, Suite 613
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(214) 387-3300

Executive Search Consultants
for the Data Processing Industry

PROGRAMMER ANALYST

Rockwell International's Truck Axle Division in Newark, Ohio, engaged in machining of heavy duty truck axle component parts, is seeking a sharp, aggressive individual.

To be considered for this position, you should possess a minimum of 3 years' experience with the IMS, DL1 and familiarity with manufacturing systems. A degree in Computer Science or Math is required. This position requires a great deal of interaction, cooperation and leadership ability. Growth potential limited only by your own capabilities.

Salary commensurate with education and experience, and a superior fringe benefit program. Only qualified candidates should apply. Send your resume to Manager of Employee Relations.



**Rockwell
International**

Truck Axle Division
Route 790Hebron Rd., Newark, Ohio 43055
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THIS SPACE FOR HIRE.



COMPUTERWORLD

MIS PROJECT MANAGER

Reliance Electric Company is currently in the process of implementing a mini-computer based system corporate-wide, utilizing the Hewlett-Packard 3000. We are currently seeking an experienced project manager to manage the H.P. software maintenance and distribution.

You should be degreed, with a broad information systems background including Data Base Management Systems, TOTAL and IMAGE preferred, plus two years in systems programming preferably on the H.P. 3000 with a knowledge of COBOL, IMAGE and SPL. You should also have been a project leader on Application Systems.

Reliance Electric is a progressive, Fortune 300 company headquartered in an attractive Cleveland suburb, offering an excellent compensation package. Please forward resume and salary requirements to the attention of J.W. Massey:

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ELECTRIC COMPANY**

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PROGRAMMER/ ANALYSTS

Major medical school's expanding scientific computer center offers positions at several levels. Will handle new and existing programs for computerized Patient Records, Medical billing and data analysis using Fortran and "C". Minimum 1 year experience required. Medical/research background helpful. These career opportunities offer excellent salary and benefits packages including 4 weeks vacation and 100% tuition reimbursement. Send resume to Jeff Rosengarten, Personnel Department.

Albert Einstein
College of Medicine
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Bronx, N.Y. 10461
equal opportunity employer

PROGRAMMER

Associate Systems Analyst/Programmer 16,236 to 19,730 per year. Systems Analyst/Programmer 13,356 to 16,236 per year in San Diego. Excellent benefits.

We are seeking several individuals to analyze systems, perform feasibility studies and write computer programs. Candidates for the associate level should have experience in systems development and programming using COBOL in an IBM OS/VS environment. Candidates for the systems level should have college level course work in information systems. Special applications are required. Apply immediately to San Diego City Schools, 4100 Normal St., Room 1241, San Diego, CA 92103. Phone (714) 293-8535. Equal Opportunity/Affirmative Action Employer.

HOUSTON DOESN'T HAVE SNOW!!!

But we do have a demand for programmers and programmer/analysts with COBOL Assembler or RPG II experience on ANY hardware. \$15-28,000.

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PERSONNEL AGENCIES, INC.**
4801 Woodway, Suite 231W
Houston, TX 77056

SYSTEMS ANALYST

Key opportunity reporting to the Director of Data Processing at the New York City Headquarters of this growing consumer products manufacturer. Successful candidate will design and develop data base and CRT network. Requires minimum 3 years experience in business applications and COBOL programming. Degree preferred.

Excellent growth potential, comprehensive benefits including tuition-refund and profit-sharing.

(201) 445-3161
John McCooe & Assoc.
Mgmt. Consultants
1250 E. Ridgewood Ave.
Ridgewood, N.J. 07450
EOE/MF

PROGRAMMER/ ANALYST

MARK IV
FORTUNE 50
FINANCIAL FIRM

We are a rapidly growing international firm located NYC, seeking several Mark IV PROGRAMMER ANALYSTS from the intermediate thru SR. levels. A minimum of 2 years Mark IV experience is required. Any design exposure is highly desirable.

For further information send resume WITH SALARY REQUIREMENTS TO:

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Field Service Engineers

Continued rapid growth at Intel, the leading independent supplier of OEM and add-on memory systems, has created opportunities for talented Field Service Engineers. If you have 2-3 years experience maintaining computer equipment and at least 1 years of IBM 370 Central Processor related background, consider joining Intel in one of these areas:

Chicago
San Francisco
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Detroit
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You'll perform preventive and remedial maintenance on all Intel products and will install, remove and upgrade field change orders. You must be proficient on IBM 370 and other vendor systems. These positions involve heavy interface with marketing and customer management.

Qualified candidates are invited to send resumes including salary requirements to Intel Commercial Systems Division, Dept. 38AC, 1302 N. Mathilda Avenue, Sunnyvale, CA 94086. An equal opportunity employer m/f.

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PROGRAMMER ANALYSTS

SEEKING CAREER OPPORTUNITIES WITH
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Federated Department Stores, a national leader in retailing, has a major systems development program in progress that is committed to developing advanced retailing systems incorporating data base and distributive processing capabilities.

Advanced technologies include:

IMS/VS MVS NCP SNA
VTAM VSAM TSO Data Dictionary

Methods Include: Top-down design, HIPO, structured walk-through, simulation.

There are still some ground floor opportunities at the forefront of design and development for PROGRAMMER ANALYSTS who have above-average credentials and would like to embark their careers in our long-term retail systems research and development program.

If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to:

Mr. Frank Mckain
Systems Research & Development, Room C-918
Federated Department Stores, Inc.
222 W. 7th Street Cincinnati, Ohio 45202
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ET

SYSTEMS ANALYSTS

The Equitable Trust Company is the second largest commercial bank in Maryland, headquartered in Baltimore. Equitable has been an area leader in the innovative use of data processing technology to enhance the Banks products and operations. Recent accomplishments have included the implementation of an on-line branch teller system utilizing IMS/SNA which will eventually process up to 30,000 transactions per hour.

Our continuing commitment to effective use of computers along with a growing demand for new applications has created the need for additional systems analysts. We are seeking individuals with a thorough knowledge of and meaningful experience with systems analysis and design techniques, and the desire and potential to progress to senior analytical/project management positions. These positions involve significant user contact, analysis and design of data processing solutions to user business problems, and direction of other project team personnel through the implementation phase. Technical qualifications include IBM programming and systems analysis/design experience, IMS and banking applications knowledge strong pluses.

EQUITABLES ENVIRONMENT OFFERS

MVS/IMS/SNA SOFTWARE	PROFIT SHARING
IBM 370/158 AP HARDWARE	LIBERAL TUITION ASSISTANCE
COMPETITIVE SALARIES	FORMAL TRAINING PROGRAM
STOCK PURCHASE PLAN	FLEXIBLE WORK HOURS

If you are interested in a challenging position working with an aggressive management team, send resume with salary history to:

Ms. Janet Oaks

Equitable Trust Co.

P.O. Box 1556
Baltimore, MD 21204
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PROGRAMMERS

SYSTEMS PROGRAMMERS

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Overnight, we are evolving from a batch-oriented (DOS/360) environment to a sophisticated "state-of-the-art" installation. Would you like to be part of a dedicated team that makes it happen? You can be if you meet these requirements:

- Proficiency in Assembler Language, OS JCL, and Utilities.
- Knowledge of an OS/VS Operating System.
- IBM S/370 Architecture.
- Ability to SYSGEN and apply fixes.
- Dump—reading/troubleshooting.

In addition, the following would be helpful:

- Installation & Maintenance of Compilers & Software Packages.
- VM/370—CMS VSAM SMP
- Hardware Planning
- Proficiency in Higher Level Language (COBOL preferred).
- Performance Monitoring/Tuning.

We are ARA Services, Inc., the national leader in our field, the 1.8 billion services management company. In addition to an excellent starting salary and comprehensive fringe benefits, we can provide you with an exciting professional atmosphere where your talents will be recognized and rewarded. Call or write FRED STUART, Executive Recruiter at (215) 574-5198.

ARA Services, Inc.

Independence Square West
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We want you to talk in our library.

Ours is a living library of spoken words. A library of roughly 40,000 textbooks on tape, available free of charge to blind students. Eligible students also include the visually impaired, the learning disabled, and the physically handicapped who cannot handle printed material.

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TECHNICAL SPECIALIST MJS COMPUTER OPERATIONS

To meet the growing information needs of our organization we currently require a Technical Specialist in our On-Line Systems group.

Ideal candidates will be proficient in OS JCL utilities, OS VS Internals, COBOL, BAL, VSAM in applying IBM Fixes (SMP and ZAPS) and in the installation and maintenance of operating packages. A working knowledge of on-line program terminal systems is required. CICS helpful however it is not essential, and we will consider training.

We offer a salary commensurate with experience, an outstanding benefit package and unique opportunities for professional advancement.

Send resume specifying current salary level, in confidence, to:

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DIRECTOR, INFORMATION SYSTEMS

Leading East Coast medical center has an immediate opening for a state-of-the-art systems professional. Reporting to the V.P. Finance, this high impact position has total responsibility, through department managers of Data Processing and Management Engineering, for:

- short and long range information systems planning;
- Data processing, including departmental organization structure and evaluation of hardware and software requirements;
- Overall management engineering activities including organization structure and evaluation methods.

Will function as the primary resource person with administrative management and medical chiefs of service to achieve optimal systems analysis and information systems programs. The successful candidate for this outstanding career opportunity will have a graduate degree and minimum of 5 years experience in systems, feasibility studies and information handling techniques, at least 2 years of which have been in a significant management capacity. Must have strong interpersonal communications skills, with hospital systems experience such as a definite preference. We offer an exceptional salary and benefits package, and an ideal location near countryside and shore areas. For confidential consideration, send resume with salary history to:

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FAIRFIELD COUNTY, CONN.

OUR CLIENT WANTS TO KNOW:

- (1) What do you want to learn this year?
- (2) What do you want to do next year?
- (3) The usual, what you have done, and what can you do Monday morning.

Job Satisfaction Has Led:

- To Efficiency.
- To a track record of Internal Promotions.
- To an increase in Career Training & Development.

Over Twenty Positions (New)

- Programmers & Analysts
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Requirements:

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Client is a major manufacturer, located in Fairfield County, Conn. Expansion of all applications: accounting, finance, marketing, data base, inventory, order entry, etc.

For a discussion of your skills/goals, in strict confidence NO RESUME REQUIRED. AFTER HOURS INTERVIEWS with EDP Management can be arranged. Contact: (914) 946-1227

Frank McGinty or Dave Tait
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TRI-STATE STAFFING ASSOCIATES, INC. (agency)
One North Broadway, White Plains, NY 10601

Openings in Rockville, MD:

• Computer Software Engineers • Systems Analysts • Communications Systems Designers

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Harness the power of an international network of 19 large-scale mainframes with state-of-the-art software.

Are you frustrated by limitations in the system you're now working with? There's no ceiling on creativity at GE. GE Information Services is built around a massive computer network, consisting of 19 large-scale mainframes (Honeywell and IBM with a 3033 on order) located in three interconnected data processing centers that serve 21 countries around the world.

Think of the possibilities. You can design new systems, develop modules for a proprietary operating system, innovate unique applications, even invent new languages, limited only by the scope and ingenuity of your conceptions. The sheer capacity and immense capabilities of the GE system invite state-of-the-art developments, since it can handle just about any conceivable program and any volume of data by the most sophisticated means you may devise.

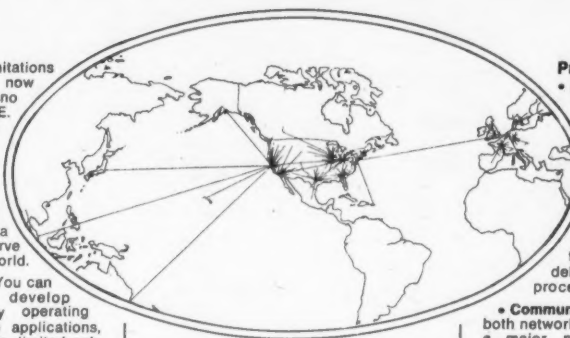
Focus on your main interest...

To match the expansive facilities, the GE professional staff is large enough to permit your concentration on many areas of special interest, including:

- distributed data processing
- data communications networks
- microprocessing
- MVS internals
- on-line data base management
- major business applications
- operating system and compiler development
- command system and JCL design

... but keep a broad grasp on the rest of the EDP field.

You should never be trapped in one narrow specialty at GE. You can move from one project area to another, always keeping the total system in full view. That mobility, along with the range and variety of problems posed by GE's Fortune 500 customers, sharpens your skills and keeps you "state-of-the-art" on all sectors along the EDP front.



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• Operating system and compiler development, for our proprietary MARK III® interactive systems including I/O drivers, logical file processors, memory allocators, TP monitor, compilers, debugging aids, and run-time processors.

• Communication software, including both network and terminal software for a major new distributed processing product.

• System software internals for our new MVS-based product line—including JES2, RACF, TSO, and RMF.

For the above-average professional with an extra spark of creativity and dedication, we have openings at all levels.

What makes Montgomery County, Maryland an ideal place for you and your family?



You'll find more than relaxed, rural-suburban living in the Montgomery County area. You'll find a "think-tank" environment. A short drive from Washington, D.C., you are in the heart of a cultural area, a prestigious community of professional, intellectual, and government leaders. Amid historical sites, museums, and the nation's preeminent fine arts centers, it's a stimulating environment for you and your family.

Send resume and salary history to: D. Donovan.

Employee Relations, RM. 48A, General Electric Information Services Business Division, 401 N. Washington St., Rockville, MD 20850.

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An equal opportunity employer, m/f



Data Processing Professionals Take the bull by the horns. We did.

By reaching out with unlimited imagination and unprecedented innovation, we've grasped the world leadership position in the beef processing industry. And we're not about to let go! Now it's your turn. Reach out to Iowa Beef and reach beyond your present boundaries in a position involving new development activities in the areas of manufacturing systems, distributive processing and others. Our state-of-the-art environment requires state-of-the-art conceptual thinking from the following professionals:

PROGRAMMER ANALYSTS

If you're looking for broader horizons, look to Iowa Beef. To qualify, you need a minimum of 2-5 years experience including 2 years of COBOL and some exposure to systems design. Successful accomplishment can lead to team leadership and project management roles.

COMMUNICATIONS SPECIALIST

Programming experience with large-scale computer systems communication hardware and software as well as a knowledge of communication protocol and programming techniques can qualify you. Experience with DATANET-355 assembly language and exposure to MPS would be helpful.

These positions are accompanied by excellent salaries and full benefits including profit sharing and cash bonus. If you're ready to take the bull by the horns, you're ready for Iowa Beef. Send your detailed resume with salary history and requirements, in strict confidence, to: Walt Maciag, Manager Professional Employment, IOWA BEEF PROCESSORS, INC., P.O. Box 3350, Sioux City, Iowa 51101.

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PROGRAMMER ANALYST

A position in the field of data processing at the Jos. Schlitz Brewing Company will provide the experienced data processing professional with a rewarding and challenging career.

If you are a Programmer Analyst with at least 4 years experience in OS-JCL, DL1, ANS COBOL, TSO, and PANVALET and want to accept a challenge, we may have the position you desire.

You can look forward to an outstanding salary and benefit package and, in addition, potential for career advancement with a leading corporation. To receive confidential consideration, send your resume along with salary history and requirements to:

Corporate Employment Office
Dept. F-1

JOS. SCHLITZ BREWING COMPANY

219 W. Galena
Milwaukee, Wisconsin 53212
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Data Processing Professionals

The Nestle Company, Inc. has grown to a 1.3 billion dollar diversified consumer packaged goods company tripling in size during the last 7 years. Not only have we expanded through strong internal growth of our existing product line, but also through timely development of new products.

To meet the increased size and complexity of our business today and in the future, we have to implement new improved systems with the latest state-of-the-art equipment. As a professional you will have the opportunity to work with the newest IBM and DEC computers, software and application packages and be encouraged to optimize your skills in our rapidly expanding environment.

Our growth has created the following openings:

- Programmer/Analysts
- Systems Analysts
- Systems Programmers (communications specialists)
- Minicomputer Specialists

We're looking for professionals with a minimum 2 years experience, college degree preferred, plus experience in IBM 370 computers, COBOL, OS/VS, VTAM, CICS, IMS/DC, PDP 1170s, BASIC and/or RSTS/E. Applications experience in areas such as financial, marketing and sales forecasting, payroll and order entry a definite advantage.

We offer attractive salaries commensurate with experience and a generous fringe benefits program.

Please send resume in confidence including salary history and salary requirements to

Employee Relations Department

The Nestle Company, Inc.

100 Bloomingdale Rd.
White Plains, New York 10605

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Nestle

SYSTEMS PROGRAMMERS

Will work in large 370 MVS (MP & UP) and 3705 (ACF NCP) environment in design, implementation, and continued enhancement of telecommunications systems and networks. Seek both intermediate and senior personnel capable of working individually or as part of a team.

Starting salaries range from \$13,860 to \$20,484, depending upon qualifications. Liberal fringe benefits, including an excellent retirement program, paid vacation, sick leave, hospitalization, and life insurance.

Please contact:

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Department of Personnel
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A unique opportunity to expand your career

A billion dollar Dallas-based Corporation is centralizing its four-state operations. This is your opportunity to work with the latest in computer designed equipment including the IBM 3032 and MVS software systems.

Positions now open include:

STANDARDS AND TRAINING ADMINISTRATOR

Organize and write technical material; adept at oral communications.
Job Assignment — develop, implement and audit data processing standards and procedures; develop administrative procedures; establish and manage system reference and project documentation library; compile training manual; coordinate all training activities.

TELEPROCESSING SPECIALIST

Communications and transmission controller background. Engineering a plus.
Job Assignment — coordinate activities required to install and maintain teleprocessing network. Remote job entry, time sharing, on-line systems; establishment of standards relating to teleprocessing network; problem determination and resolution; ongoing analysis of network operation; coordinate installation of teleprocessing hardware and software; review of new systems requiring teleprocessing; provide technical assistance and programming.
This is a new MVS shop and involves setting up interstate network and monitoring facilities.

APPLICATION SUPPORT PROGRAMMER

Must know COBOL, BAL, JCL, and read memory dumps.
Job Assignment — design, program and maintain software; analyze changes and enhancements to software; install and test new and modified software; monitor disk storage; code utility program; maintain necessary libraries; program control programs; translate memory dumps.

SYSTEMS SOFTWARE ANALYST

Experience in any of the following is a plus — CICS/VS, TSO, JES2, PUT, SMP, SRM, TCAM, VTAM, NCP.
Job Assignment — Step-up centralized corporate computer center in this new MVS shop. Responsibilities include analysis, implementation, modification of all operating systems. These include micro/mini processors, central corporate computer, teleprocessing transmission controllers, remote job entry terminals.

Send resumes in confidence to:



Central and South West Corporation
Employee Relations Department
2700 One Main Place
Dallas, Texas 75250

Equal Employment Opportunity Employer

DATA PROCESSING INSTRUCTOR

Full-time instructor with Data Processing background. Master's degree or Bachelor's degree plus experience in the field and ability to teach COBOL, RPG, BASIC, computer systems, programming logic and theory. Qualified candidates should write for more information at Kalamazoo Valley Community College, 6767 West "O" Avenue, Kalamazoo, MI 49009. An Equal Opportunity Employer.

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DP On-Line
Prog/Anal \$18,807-\$22,189
DP Operations
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DATA PROCESSING

PROGRAMMER ANALYSTS

MSA SOFTWARE EXPERIENCE
\$16,000 to 22,000

Several corporations in ATLANTA, HOUSTON, and CHICAGO have recently purchased MSA applications software packages, and seek Programmer/Analysts who will be responsible for these systems. Experience in COBOL on large scale hardware (particularly IBM) with MSA General Ledger, MSA Payroll or MSA Personnel Management products is the key. Excellent growth opportunities with progressive corporations. To explore these and hundreds of other data processing opportunities, call:

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FEDERAL CIVIL SERVICE CAREER

with the

DEPARTMENT OF INTERIOR BUREAU OF MINES

Computer Programmer, GS-334-9
Starting Salary \$15,090

Position involves programming in scientific areas relating to real-time process control, general and specific data reduction, maintenance and updating of existing programs. A Bachelor's degree (or equivalent) and two years programming experience (or a Master's Degree) in FORTRAN on a DEC PDP-11 Computer are required. Headquarters is located at 4800 Forbes Avenue, Pgh., PA 15213. For interview, collect calls will be accepted by Henry E. Perlee at (412) 892-2400, ext. 702. The Bureau of Mines is an Equal Opportunity Employer. Applicants must be United States citizens.

DP Professionals

San Francisco Opportunity

The information explosion has created an unusually good opportunity for skilled talents to contribute to application systems development. Let us explore a career match for you with our clients.

Industries:
Classical and Process Manufacturing; Retail; Distribution; Banking.

Environments:
IBM S/370 mod. 135 through mod. 3033; DOS/VS, OS/VS, DBMS, Communications, Interactive Computing, COBOL, PL/1, ALC.

Job Types:
Programmers, Analysts, Project Leaders, Systems Programmers, Data Base Analysts.
For immediate consideration, please send your resume and salary history in confidence to Consultant. Write CW Box 1685, 797 Washington St., Newton, MA 02160.

SYSTEMS ANALYSTS

Do You Want To Participate In The Product Development And Market Strategy For New, Advanced Systems? If So...

Mohawk Data Sciences is one of the world's major factors in the data processing industry. We are an acknowledged leader in intelligent data entry, communications, and distributed data processing.

Due to expansion, we have immediate career opportunities for marketing-oriented EDP analysts with field experience in mini and micro systems to join our Corporate Marketing Staff.

We invite you to contact us if you desire to work in a challenging and creative environment, and have demonstrated knowledge in data entry and distributive processing systems. Experience in teleprocessing or data base software a plus.

For immediate, confidential consideration, please send resume including present salary to:

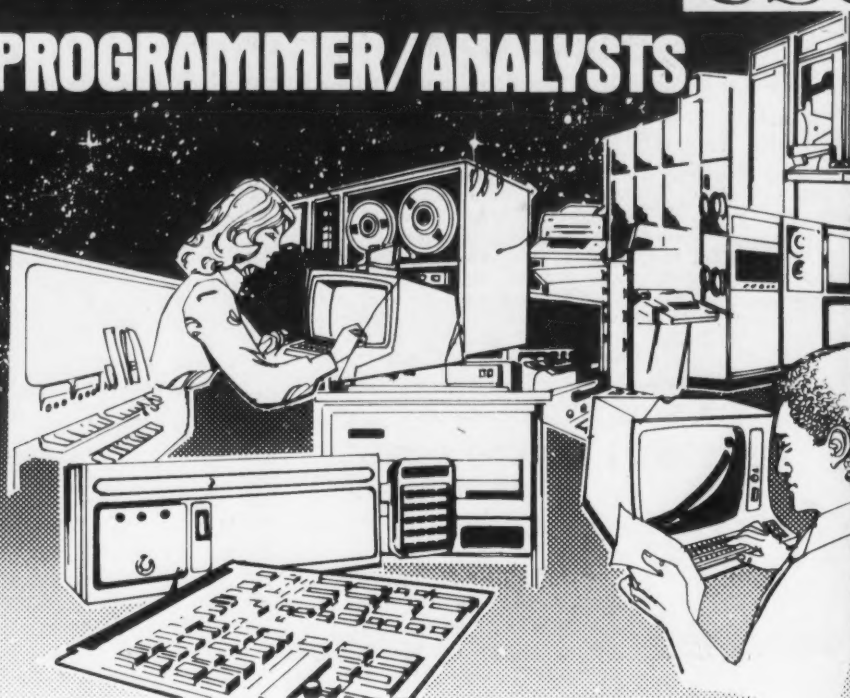
MR. D.P. McCONNELL
Director of Corporate Personnel

Mohawk Data Sciences

1599 Littleton Rd., Parsippany, N.J. 07054
An Equal Opportunity Employer (M/F)



PROGRAMMER/ANALYSTS



IBM: 360, 370
CDC: 3200, 6600, CYBER
XDS/HONEYWELL: SIGMA
3,5,7,9,; 930
MODCOMP: MODCOMP II, IV
VARIAN: 6201, V76
ROLM: 1602

UNIVAC: 642B, 1108, 1110
HONEYWELL: H316, H632,
H716
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SEL: 32/55
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PROGRAMMERS ANALYSTS

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UPPER MIDWEST

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CALL GEORGE MERRIAM
COLLECT AT (612) 335-6451 OR

send resume to

DUNHILL OF
MINNEAPOLIS INC

730 2nd Avenue South Suite 1135
Minneapolis, Minn. 55402

Manager of Systems & Procedures

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Reply in writing stating qualifications and salary requirements to A.J. Falco, Personnel Manager

Robertshaw
CONTROLS COMPANY

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CHALLENGING CAREER OPPORTUNITY IN IMAGE ANALYSIS

LOS ALAMOS SCIENTIFIC LABORATORY

Our Laboratory, a multi-faceted national R&D facility, is seeking an experienced scientist or engineer to work in our Laser Fusion Target Fabrication Program.

The position involves developing and bringing on line automated image analysis techniques used with X-ray microradiography to measure and quality-characterize microballoons. Will also aid in development of new, higher-resolution measurement and characterization techniques and in the design, development and fabrication of the microprocessor-controlled instruments and devices used in target fabrication. The successful candidate must have a B.S. or advanced degree in computer science or electrical engineering, with several years' experience in generating software for mini- and microprocessors and in design and fabrication of interfaces and/or instruments using microprocessors or minicomputers.

Operated by the University of California for the Department of Energy, the Laboratory provides excellent working conditions and benefits, such as a variety of professional growth opportunities and 24 days' annual vacation. Our setting in the mountains of northern New Mexico offers a pleasing lifestyle in a setting of great natural beauty: a pollution-free environment; abundant recreational activities; casual, uncrowded living; a superior school system; and low taxes.

Send complete resume, in confidence, to:

James Trout
DIV - 78-AT
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545



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Unique opportunity for an ambitious self-starter. Private NYC college is seeking a solid OS PL-1 programmer with knowledge of COBOL. Experience in commercial applications; good user interface. Full program of benefits including full tuition, plus annual salary review.

Send resume and salary requirements or call collect:
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F. Temchin, Personnel Officer

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Polytechnic

TECH SUPPORT MANAGER 4 Week Vacation!

Progressive NYC major medical center utilizing IBM 370/148 seeks self-starter to take charge of technical support area. Systems programming experience in DOS/VS, CICS/VS (or comparable DC system), and DL1 (or comparable DB system) essential. Strong BAL and COBOL programming also required. OS/VS and PL/1 knowledge a plus; degree preferred. Salary to high \$20's, excellent benefits including 4 weeks' vacation and tuition refund. For a TECHNICAL INTERVIEW, send resume to Director of Data Processing, Box # 1234 NPM, 655 Madison Avenue, New York, N.Y. 10021. An Equal Opportunity Employer, M/F.

By the time we get to Phoenix



SOFTWARE/HARDWARE DESIGN

Specify, design, and test digital logic hardware and diagnostic software. Develop maintenance facilities to detect and correct present and latent hardware and software faults. Develop programs for common control diagnostics and recovery and diagnostic programs for peripheral equipment and maintenance support programs.

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Development and execution of comprehensive test plans to evaluate the performance of large stored program switching systems. Execute configuration management on all hardware, software, and documentation and maintain project control for all activities. System evaluation and test performed on both laboratory prototypes and initial field site locations.

We offer an excellent salary/benefit package (including hospitalization, major medical, dental, relocation assistance, disability and life insurance; pension plan and credit union) modern facilities and a climate conducive to personal and professional growth. If you possess a minimum of a BS, Electrical Engineering, Computer Science or any other appropriate engineering discipline and your experience compliments any of these positions described above, please send resume in confidence to: Manager of Recruiting, Dept. C-918 GTE Automatic Electric Laboratories, 11048 North 23rd Avenue, Phoenix, Arizona, 85029. We are an equal opportunity employer m/f.

Beautiful, sunny Phoenix. Where our engineering teams will be continuing to help revolutionize the telecommunications industry through its research and development of advanced software development techniques, distributed processing architecture and real-time digital systems. Here you'll find unparalleled opportunities to get in on the ground floor stages of creative research and development with one of the finest R&D teams in the nation.

Currently we are seeking:

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APPLICATIONS SOFTWARE. Large scale development in telephone system real-time control.

Maintenance and fault recovery software, administrative software involving real-time data base administration, switch and network management software, as well as operating system/executive software.

SUPPORT SOFTWARE. Involved in compiler, assembler and simulator development, as well as system utilities and software development tools. Support effort is related to large IBM processors, micro-processors, and mini computer systems.

DATA BASE SOFTWARE. Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems.



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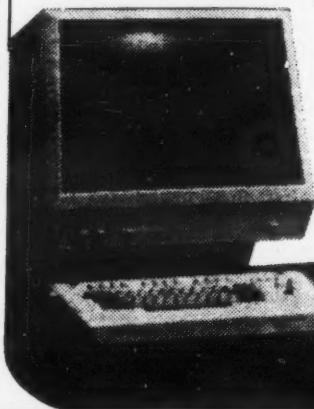
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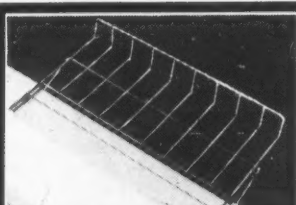
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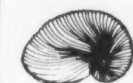
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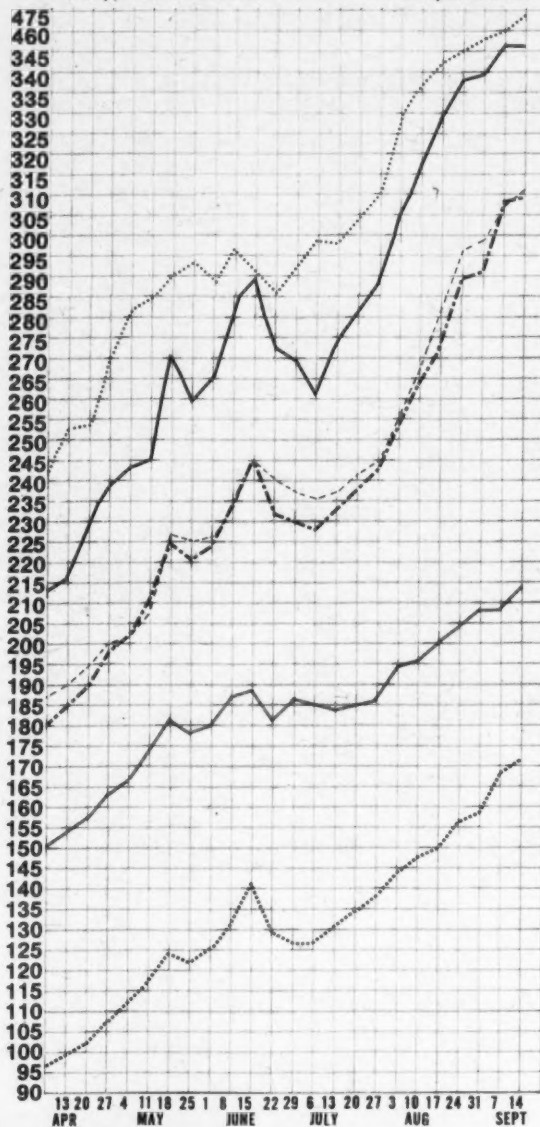
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Revenue	449,126,000	369,767,000
Tax Cred	300,000	...
Earnings	25,185,000	17,103,000
6 Mo Shr	2.38	1.74
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Tax Cred	600,000	300,000
Earnings	41,166,000	30,094,000

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Three Months Ended July 1

	1978	1977
Shr Emd	\$2.20	\$1.16
Revenue	32,038,000	26,917,000
Earnings	1,339,000	1,111,000
6 Mo Shr	.34	.29
Revenue	62,870,000	53,281,000
Earnings	2,365,000	2,095,000

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Three Months Ended June 30

	1978	1977
Shr Emd	\$1.78	\$1.59
Revenue	142,400,000	85,400,000
Earnings	9,400,000	5,700,000
6 Mo Shr	1.39	1.21
Revenue	285,900,000	164,000,000
Earnings	16,800,000	11,300,000

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Three Months Ended June 30

	1978	1977
Shr Emd	\$0.03	\$0.03
Revenue	20,594,000	17,673,000
Tax Cred	441,000	408,000
Earnings	851,000	876,000

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Three Months Ended June 30

	1978	1977
Shr Emd	\$1.17	\$0.98
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CLOSING PRICES TUESDAY, SEPTEMBER 12, 1978

All statistics compiled,
 computed and formatted
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E X C H	PRICE					E X C H	PRICE					E X C H	PRICE				
	1978 RANGE (1)	CLOSE SEP 12 1978	WEEK NET CHNGE	WEEK PCT CHNGE	1978 RANGE (1)		CLOSE SEP 12 1978	WEEK NET CHNGE	WEEK PCT CHNGE	1978 RANGE (1)	CLOSE SEP 12 1978		WEEK NET CHNGE	WEEK PCT CHNGE			
COMPUTER SYSTEMS																	
A ANDAHL CORP	28-69	62 1/8	+2 7/8	+4.8	O ADVANCED COMP TECH	1- 2	1 5/8	- 1/4	-13.3	O DATA ACCESS SYSTEMS	3-14	12 1/2	-1 3/4	-12.2			
N BURRUGHS CORP	59-87	84 7/8	-2	-2.3	O ANACOMP INC	8-22	17 1/2	+3 1/2	+25.0	O DATA 100	9-20	19 1/4	0	0.0			
O COMPUTER AUTOMATION	23-44	35 1/4	0	0.0	A APPLIED DATA RES.	0-17	15 7/8	0	0.0	A DATA-PRODUCTS CORP	15-25	23 5/8	- 1/4	-1.0			
N CONTROL DATA CORP	23-44	44 1/8	+1 1/4	+2.9	N AUTOMATIC DATA PROC	24-36	33 1/4	- 3/8	-1.1	O DATUM INC	2- 6	5 3/8	- 1/8	-2.2			
O CRAY RESEARCH INC	21-74	62	-11 1/2	-15.6	O COLEMAN AMERICAN COS	1- 2	1 7/8	0	0.0	O DECISION DATA COMPUT	2- 6	5	- 1/2	-8.0			
N DATA GENERAL CORP	42-71	69	+2 1/2	+3.7	O COMPU-SERV NETWORK	7-12	8	+ 1/4	+3.2	O DELTA DATA SYSTEMS	1- 1	3/4	+ 1/8	+20.0			
N DATAPoint CORP	34-75	73 1/2	-1	-1.3	C COMPUTER HORIZONS	1- 9	9 1/4	+ 1/4	+2.7	A DOCUMENTATION INC	6-31	30 5/8	+ 5/8	+2.0			
N DIGITAL EQUIPMENT	39-54	53 1/8	0	0.0	O COMPUTER NETWORK	8-16	14 5/8	+ 3/8	+2.6	O DATARAM CORP	6-31	30 1/2	+9 3/4	+46.9			
N ELECTRONIC ASSOC.	2-13	10 7/8	-1	-8.4	N COMPUTER SCIENCES	8-17	15 1/4	- 5/8	-3.9	N ELECTRONIC M & M	4- 9	7 3/4	- 1/8	-1.5			
A ELECTRONIC ENGINEER.	11-39	14 3/8	+ 1/2	+3.6	O COMPUTER TASK GROUP	1- 4	3 1/4	0	0.0	O FABRI-TEK	1- 2	1 7/8	0	0.0			
O FOUR-PHASE SYSTEMS	19-46	46	+4	+9.5	O COMPUTER USAGE	2- 4	4 1/4	+ 1/8	+3.0	O GENERAL COMPUTER SYS	1- 3	2	- 1/4	-11.1			
N FOXBORO	28-40	38	- 1/4	-0.6	C COMSHARE	6-19	19 1/4	+ 1/2	+2.6	N HAZELTINE CORP	10-17	16 1/2	- 1/8	-0.7			
O GENERAL AUTOMATION	7-26	23 1/2	-1 3/4	-6.9	O DATA DIMENSIONS INC	4- 9	7 5/8	- 1/8	-1.6	N HARRIS CORP	40-72	72	+3 3/8	+4.9			
O GRI COMPUTER CORP	1- 2	1 1/2	0	0.0	O DATATAB	1- 2	1 1/4	- 1/4	-16.6	O INFOTEC INC	6-11	11	+1	+10.0			
N HEWLETT-PACKARD CO	62-93	91 1/2	+ 3/4	+0.8	N ELECTRONIC DATA SYS.	15-25	23 3/4	- 5/8	-2.5	O INFORMATION INTL INC	8-12	10 1/2	+ 1/2	+5.0			
N HONEYWELL INC	43-72	72	+ 3/8	+0.5	O INSYTE CORP	1- 2	2 5/8	0	0.0	O INTEL CORP	39-62	60	+1 1/2	+2.5			
N IBM	236-305	300 7/8	+ 7/8	+0.2	C IPS COMPUTER MARKET.	2- 3	3 1/4	0	0.0	A LUNDY ELECTRONICS	4- 7	8	+1	+14.2			
O MANAGEMENT ASSIST	9-29	25 1/2	-2 7/8	-10.1	O KEANE ASSOCIATES	3- 6	6	- 1/8	-2.0	O MSI DATA CORP	12-19	17 1/4	0	0.0			
O MICRODATA CORP	10-23	21 7/8	-1 1/8	-4.8	O KEYDATA CORP	1- 3	2 1/8	0	0.0	N MEMOREX	27-59	59	+2 3/4	+4.8			
O MINI-COMPUTER SYST	5- 8	7	+ 1/2	+7.6	A LOGICON	11-19	18 3/4	+ 1/4	+1.3	N MOHAWK DATA SCI	6-15	13 5/8	+ 3/4	+5.8			
O MODULAR COMPUTER SYS	7-17	16 1/2	+ 1/8	+0.7	A MANAGEMENT DATA	1- 1	7/8	0	0.0	O DMEX	2- 2	2 1/2	0	0.0			
N NCR	37-67	66 3/4	- 1/8	-0.1	A NATIONAL CSS INC	15-36	34	+ 1/8	+0.3	O PENRIL CORP	5-12	11 3/8	+1	+9.6			
N PRIME COMPUTER INC	20-43	40 3/4	0	0.0	O NATIONAL DATA CORP	7-13	12 3/4	+ 1/4	+2.0	N PERTEC CORP	9-15	14 7/8	+ 1/4	+1.7			
N PERKIN-ELMER	17-28	27 3/4	- 1/8	-0.4	A ON LINE SYSTEMS INC	17-30	28 5/8	- 3/8	-1.2	A POTTER INSTRUMENT	2- 2	1 3/4	0	0.0			
N RAYTHEON CO	29-58	53	-1 1/4	-2.3	N PLANNING RESEARCH	4-10	10	+ 1/4	+2.5	O QUANTOR CORP	2- 5	2 1/2	- 1/8	-4.7			
N SPERRY RAND	33-49	47 7/8	+ 1/2	+1.0	O PROGRAMMING & SYS	1- 1	1	0	0.0	C RECOGNITION EQUIP	7-13	12 3/4	+ 3/4	+6.2			
A SYSTEMS ENG. LABS	11-24	19 3/8	-1 3/8	-6.6	O RAPIDATA INC	3- 7	6 3/4	- 1/8	-1.8	O SCAN DATA	1- 5	3 3/4	0	+1.6			
A WANG LABS.	12-32	30 1/8	-1 1/4	-3.9	O REYNOLDS & REYNOLD	18-36	32 1/4	0	0.0	N STORAGE TECHNOLOGY	19-46	37 1/4	+2 5/8	+7.5			
LEASING COMPANIES																	
O BOOTHE COURIER CORP	13-18	20 1/2	+3	+17.1	O SCIENTIFIC COMPUTERS	3- 8	8 7/8	+7/8	+10.9	O T BAR INC	11-20	19 1/4	0	0.0			
O COMDISCO INC	5-19	19 1/4	+3 1/4	+20.3	O TYMSHARE INC	18-33	33 1/8	+1 5/8	+5.1	O TALLY CORP.	4- 9	7 5/8	- 1/4	-3.1			
A COMMERCE GROUP CORP	1- 1	5/8	0	0.0	A URS SYSTEMS	5- 7	7 3/8	+3/8	+5.3	A TEC INC	6-13	12	- 3/4	-5.8			
A COMPUTER INVESTS GRP	1- 7	5 1/2	0	0.0	N WYLY CORP	1- 7	7 3/8	+1 1/8	+18.0	N TEKTRONIX INC	33-48	48 1/4	+4 1/2	+10.2			
N DATRONIC RENTAL	1- 2	1 5/8	- 1/8	-7.1	PERIPHERALS & SUBSYSTEMS												
A DCL INC	3- 5	4 1/2	0	0.0	N ADDRESSOGRAPH-MULT	14-32	31 1/8	- 3/8	-1.1	O BARRY WRIGHT	14-30	29 7/8	+3 7/8	+14.9			
N DPF INC	8-14	12 1/2	+ 1/8	+1.0	O ADVANCED MEMORY SYS	7-18	18 1/4	+ 5/8	+3.5	O CYBERMATICS INC	1- 1	1 1/4	0	0.0			
N ITEL	16-36	35 7/8	+1 1/2	+4.3	N AMPEX CORP	10-19	18 7/8	- 3/8	-1.9	O DUPLEX PRODUCTS INC	18-30	29 1/2	- 3/4	-2.4			
N LEASCO CORP	24-36	33 1/8	- 1/2	-1.4	O ANDERSON JACOBSON	5-10	9 1/4	+ 1/4	+2.7	N ENNIS BUS. FORMS	8-17	14 7/8	+1 1/2	+11.2			
O LEASPCORP	1- 4	2 7/8	0	0.0	N APPLIED DIG DATA SYS	13-22	18 3/4	-1 3/4	-8.5	N 3M COMPANY	43-66	64 3/8	+ 1/2	+0.7			
A PIONEER TEX CORP	5- 7	6	+ 1/8	+2.1	O BEEHIVE INT'L	4- 7	7 1/8	+ 3/8	+5.5	O MOORE CORP LTD	26-34	31 1/4	+ 3/4	+2.4			
N U.S. LEASING	13-20	19 5/8	0	0.0	A BOLT, BERANEK & NEW	6-11	11	+1	+10.0	N NASHUA CORP	18-37	36	+ 1/2	+1.4			
SOFTWARE & EDP SERVICES																	
O CAMBRIDGE MEMORIES	3- 9	7 5/8	- 1/8	-1.6	N BUNKER-RAND	10-20	19	- 1/8	-0.6	O STANDARD REGISTER	20-27	26 1/4	- 1/4	-0.9			
O COGNITRONICS	1- 4	2 1/2	0	0.0	A CALCOMP	3-13	12 1/2	- 1/2	-3.8	A TAB PRODUCTS CO	8-16	16	+ 1/2	+3.2			
O COMPUTER COMMUN.	6-12	11 5/8	- 3/8	-3.1	O CAMBRIDGE MEMORIES	3- 9	7 5/8	- 1/8	-1.6	N UNIBUS	19-28	27	+ 7/8	+3.3			
O COMPUTER CONSOLES	4-10	9	+ 1/4	+2.8	N CENTRONICS DATA COMP	16-35	31 3/4	- 3/4	-2.3	A WABASH MAGNETICS	10-22	21 1/2	- 7/8	-3.9			
A COMPUTER EQUIPMENT	3- 6	5 5/8	+ 1/8	+2.2	O COGNITRONICS	1- 4	2 1/2	0	0.0	N WALLACE BUS FORMS	18-33	33 1/4	+2 1/4	+7.2			
O COMPUTER TRANSCIEVER	1- 2	2 1/2	+ 1/2	+25.0	O COMPUTER COMMUN.	6-12	11 5/8	- 3/8	-3.1								
O COMTECH	9-38	36 1/2	0	0.0	O COMPUTER CONSOLES	4-10	9	+ 1/4	+2.8								
N CONRAC CORP	19-26	22 3/4	- 1/2	-2.1	A COMPUTER EQUIPMENT	3- 6	5 5/8	+ 1/8	+2.2								
					O COMPUTER TRANSCIEVER	1- 2	2 1/2	+ 1/2	+25.0								
					O COMTEN	9-38	36 1/2	0	0.0								

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